Developing Educators of European Undergraduate Dental Students:

Towards an Agreed Curriculum

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SUMMARY

Recent developments in European dental education are student-focused, concerned, for example, with competency-based and problem-based learning. The development of dental educators has so far received little consideration. This study aimed to agree curriculum content for developing dental educators so that they are better able to support changing undergraduate dental education.

Adopting consensus methodology, a two-round Delphi was conducted in 2012. Fifty-three dental educators attending the Association of Dental Education in Europe (ADEE) annual conference 2010-2011 and 39 dental students attending the European Dental Students Association (EDSA) volunteered to take part. The Delphi questionnaire was developed based on literature, piloted, and sent to participants to gather opinions of and seek consensus on educational content using rating-scales and open-ended questions. Numeric data were analysed using descriptive statistics and qualitative data were analysed thematically.

This study identified required educational content for undergraduate-teachers and practical issues for developing dental educators. This study revealed seven domains of curriculum content for dental educators. Four domains were deemed essential in which all educators should be competent: educational principles; educational practice in dentistry; curriculum, quality, and improvement; and educational professionalism. Three domains were optional which could be tailored to local needs include: educational principles in specific context, educational research, and educational and healthcare management. When developing training for dental educators, factors which need consideration are: scope and type of educational content; academic position and teaching experience of educators, roles and responsibilities of educators, the nature of undergraduate dental education, and local and cultural contexts.

The results are beneficial for (1) individual educators to inform professional development plans, (2) institutions to devise faculty developments, (3) ADEE to inform policies on developing European dental educators, and (4) other disciplines to inform training for their educators.

Supachai Chuenjitwongsa

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support since I was a dental student; the best teacher of my life. I always respect and love her as if she were my mum.

This thesis is also dedicated to Mr.Gareth Lumsdaine and his family. They love and support me in every aspect of my life. They always make me feel happy like I am at home. I would like to thank them and tell them, via a part of Welsh song 'Adra' by Gwyneth Glyn, that:

"Does unman yn debyg i Adra, na. Ond mae Adra'n debyg iawn i chdi." - There is no place like Home, no. But Home is very much like you.

Lastly, deepest thanks and respect to Welsh people and society. Being an international student, in my opinion, is about taking and giving. I came to Wales to 'take' knowledge and qualification for my future career. At the same time, I need to 'give' something back to this lovely country. I decided to learn Welsh, promote Welsh language and culture, and contribute to Welsh society as much as I could as my way to 'give' back to Wales and Welsh people. For me, although I am not Welsh natively, I am so proud to be a part of Wales and be able to promote Welsh language and culture. Cymru am byth!

Supachai Chuenjitwongsa

TABLE OF CONTENTS

(Continued)

Literature Review

Supachai Chuenjitwongsa

Literature Review

Supachai Chuenjitwongsa

(Continued)

Literature Review

Supachai Chuenjitwongsa

(Continued)

Methodology

Supachai Chuenjitwongsa

(Continued)

Supachai Chuenjitwongsa

(Continued)

Result and Discussion

Supachai Chuenjitwongsa

(Continued)

Result and Discussion

Supachai Chuenjitwongsa

Conclusion

Supachai Chuenjitwongsa

(Continued)

References and Appendices

Supachai Chuenjitwongsa

LIST OF TABLES

Supachai Chuenjitwongsa

(Continued)

Supachai Chuenjitwongsa

(Continued)

Supachai Chuenjitwongsa

(Continued)

Supachai Chuenjitwongsa

LIST OF FIGURES

Supachai Chuenjitwongsa

LIST OF ABBREVIATIONS

Abbreviation	Full Term
AAMC	Association of American Medical Colleges
ADEE	Association for Dental Education in Europe
AoME	Academy of Medical Educators
BOS	Bristol Online Survey
CBC	Competency-Based Curriculum
CBE	Competency-Based Education
COPDEND	Committee of Postgraduate Dental Deans and Directors
CPD	Continuing Professional Development
EBOHC	Evidence-Based Oral Healthcare
EBP	Evidence-Based Practice
Educator-curriculum	Curriculum for Developing Dental Educators
EDSA	European Dental Students Association
EEC	European Economic Community
EHEA	European Higher Education Area
ENQA	European Association for Quality Assurance in Higher Education
EU	European Union
FD	Faculty Development
GDC	General Dental Council
GLOBE	Global Leadership and Organizational Behaviour Effectiveness Research
HE	Higher Education
HEA	Higher Education Academy
HUA	High Uncertainty Avoidance
LPD	Large Power Distance
LSI	Learning Style Inventory
LTO	Long-Tern Orientation
LUA	Low Uncertainty Avoidance

Supachai Chuenjitwongsa

(Continued)

Abbreviation	Full Term
MMIs	Multiple Mini-Interviews
NLN	National League for Nursing
OBE	Outcome-Based Education
PBL	Problem-Based Learning
PG	Postgraduate
QA	Quality Assurance
QAA	Quality Assurance Agency for Higher Education
SDL	Self-Directed Learning
SPD	Small Power Distance
SPSS	Statistical Package for the Social Sciences
SREB	Southern Regional Education Board
STO	Short-Term Orientation
TEL	Technology-Enhanced Learning
UG	Undergraduate
UG-curriculum	Undergraduate Curriculum
UG-DentalEduc	Undergraduate Dental Education
UK	United Kingdom
VARK	Visual, Aural, Read/write, and Kinaesthetic Sensory Modalities
WFME	World Federation for Medical Education

Supachai Chuenjitwongsa

Chapter 1 Introduction

Prologue

Dental education in Europe has been under continuous development for many decades. A central aim of dental education is to educate students to be competent dentists to serve societal needs and improve European oral healthcare. Recent developments have primarily focused on the undergraduate student-centred eduaction (Cowpe et al. 2010; Manogue et al. 2011); for example, the outline of the dental graduate profile, competency-based education and problem-based learning. However, dental educators, who are the main contributors to dental education, have received little attention. Although there is an increasing realisation of the importance, roles and contributions of health professional educators (especially medical educators) (e.g. Hesketh et al. 2001; Harris et al. 2007; Bligh and Brice 2009), the development of roles and educational competences of dental educators in Europe, as well as research and policy in this area, has been overlooked. This lack of attention paid to the competences and ability of dental educators could compromise the long-term development of European dental education. This research study seeks to address this gap. With a primary focus on 'dental educators', it aims to identify an agreed curriculum content for developing educational competences in educators of European undergraduate dental students. The ultimate goal of the study is to contribute new knowledge for the sustainable development of European dental education.

This first chapter comprises two main sections. The first outlines the background and rationale of this research study, highlights a gap in the literature and identifies potential problems within the area of 'developing dental educators in Europe'. The second section sets out the research question, aim and objectives of the study based on research propositions. It

is hoped that readers of this chapter will gain an understanding of this research project and appreciate its novelty and contribution to European dental education.

1.1 Background

1.1.1 Undergraduate Dental Education (UG-DentalEduc)

Globally, dental education has been moving towards competency-based education (CBE). Four main characteristics of CBE are indicated in the literature; education informed by societal and patient needs (Chambers 1998; Gruppen et al. 2012), emphasis on student-centred approaches (Frank et al. 2010a; Taber et al. 2010), focus on learning achievement (Gruppen et al. 2012), and a move away from time-based training (Frank et al. 2010b). Sometimes, CBE is used interchangeably with outcome-based education (OBE) (see Chapter 2). Regardless of the terminology, the core concept is that competences/outcomes are identified and shape the curriculum (including the teaching, learning and assessment). However, within CBE the roles, duties and development of educators have not been well defined and previous research has focused on educational change processes, rather than preparing educators to support change (Crain 2008; Dunning et al. 2009).

Undergraduate (UG) education is a term that covers more than just a curriculum, its components (e.g. teaching/learning), and students. It also covers the broader aspects, including management and leadership (Oliver et al. 2008), and healthcare systems and society (Haden et al. 2006). Dental education comprises many components and involves a variety of stakeholders. Although students are the central curriculum focus, educators are equally important as it is they who determine the quality of the education. Previously, the academic career pathways in the UK, for instance, relied mainly on research and scholarship, rather than on teaching. Teaching

recognition and the development of teaching as a profession has gradually been realised and acknowledged since the Dearing Report in 1997 and since then these issues have been promoted by the Higher Education Academy (HEA). However at the European level, dental educators and their development have still received little consideration.

The nature of UG-DentalEduc is another issue which relates to dental educators. Dentistry is a profession which has a unique educational characteristic; teaching and learning in dentistry involves not only interaction between students and educators, but also specific materials, procedures, and patients (Sweet et al. 2008). Clinical dentistry has a characteristic that involves tacit knowledge which is developed gradually and internally as students begin to become integrated into the profession (Fugill 2012). It seems that dentistry has features which require unique educational approaches and development.

1.1.2 Educators of Undergraduate Dental Students

The first step in developing dental educators is to clearly understand who they are and their roles and responsibilities within dental education. This study focuses on the educators of UG dental students. The term 'dental educators' is used throughout this research project to represent them. The role of 'educators' (including dental educators), including teaching, research, management, and healthcare has been explored in previous research (Scott 2003b; Hand 2006; Bullock and Firmstone 2008). However, these roles were restricted to university academics and may not be relevant to dental educators who work in a non-academic context.

From the discussion above, the definition of dental educators is still unclear and the literature to provide insight into this area is lacking. This is possibly one reason why the issue of dental educators has received little attention.

1.1.3 Dental Education in Europe

The development of education in Europe, for many countries, originated from the formation of European Economic Community (EEC). A major movement in dental education started after the beginning of European Union (EU). One important aim of the EU is to promote a single European area by supporting free moment of citizens, so as to improve employability and enhance global competitiveness for all within. In order to support this aim, a harmonisation of qualifications across Europe (now called European Higher Education Area – EHEA) was implemented through the Bologna process (Pechar 2007).

In response, major reforms and harmonisation processes of European dental education were launched in 1998 through the DentEd Thematic Project (Shanley et al. 2002; Oliver and Sanz 2007; Reynolds et al. 2008). This resulted in three important developments: the profile and competences of European dentists (Cowpe et al. 2010), curriculum structure and content in European UG dental curricula (Manogue et al. 2011), and quality assurance for European dental schools (Jones et al. 2007). These developments in European dental education have been student-focused, yet educators are also key players within the education system (Harden and Crosby 2000; Hand 2006). Policy relating to dental educators and their development is lacking.

Previously, dental education was a part of medicine. Since 1782, when dentistry firstly became an independent discipline, the concept of dental education had been developed into two aspects – odontology (dental-oriented dentistry) and stomatology (medically-oriented dentistry) (Bánóczy 1993). Odontology gradually lost connection with medicine and general health. At the same time, stomatology did not emphasise dental competences and practices (Hobdell and Petersson 2001). Thanks to the Bologna Process, more recently European UG-DentalEduc has moved toward odontology and many problems linked to these two different aspects

were solved. However, one issue which has not yet been resolved is developing dental educators. Several European dental schools have stomatology-based resources and systems and their educators are familiar with stomatological-based educational context. Because of this problem, stomatology-based dental educators may not possess similar educational competences as odontology-based dental educators have. Thus, it is important to identify the core educational areas in which dental educators (regardless of their background) need to develop competence.

1.1.4 Developing Dental Educators

In order to provide appropriate development, the first issue that needs consideration is identification of the roles and competences of dental educators, as they indicate the scope and content of a development plan. The roles of dental educators are influenced by several factors including change and development in education, healthcare systems and needs, research and innovation, and requirements for career development (Jones et al. 2007; Smesny et al. 2007; Winning et al. 2008; Heflin et al. 2009). It is important for educators to balance their roles to maximise their personal effectiveness, as well as provide high quality education and maintain professional development. For this reason, there have been attempts to identify the roles of educators. It has been suggested that the roles of educators involve three elements: teaching, research, and management (Bligh and Brice 2009). The main roles of educators are to teach, conduct research, carry out clinical practice, and management (Scott 2003b; Harris et al. 2007). Educators would primarily fulfil teaching and research roles (Hand 2006). It is evident that there is no definitive classification of dental educator roles, as their roles depend on context and how they contribute within the context.

The competences of dental educators need to be relevant to the roles which educators perform. Previous research studies have identified a huge set of

competences which educators need to develop (see Chapter 3). Interestingly, competences identified by empirical studies (Hesketh et al. 2001; Srinivasan et al. 2011) cover only particular areas, such as teaching and learning, assessment, curriculum, professionalism. These areas indicate competences which are necessary for performing a specific role in a specific context. In contrast, standards or documents from professional bodies (SREB 2002; AoME 2011; COPDEND 2013a) provide broader areas of competence, including management, educational research, and quality assurance. These competences are essential for the general development of the profession. However, individual educators may not need to be competent in every educational aspect (Hand, 2006), but they do need to be competent in areas relating to their specific role.

Additionally, on one hand, it is perceived that educators need to possess subject expertise to be effective educators (Azer 2005; Yee et al. 2006); while on the other hand some argue that educational knowledge and skills are more beneficial than expertise (Khan and Coomarasamy 2006). These polarised views make it difficult to construct an acceptable training and development programme for dental educators for effective teaching and learning in UG-DentalEduc.

The above notion raises a question about which areas do all dental educators need to be competent in as a minimum requirement for being an effective educator. Unfortunately, there is limited literature in this area. Similar to the discussion in previous sections, this makes it is difficult to support change in dental education.

Several factors can influence the development of dental educators. Culture, particularly, is an issue which needs consideration, especially if the development involves a large area such as Europe. Europe comprises

different subcultures and dental educators in different countries will need development and training which is congruent with the local context. Hofstede (2011) reveals that culture influences people's behaviours and it also impacts on how they learn and develop knowledge. Student learning styles also vary according to their socio-cultural background (Holtbrügge and Mohr 2010) and they are embedded within an individual's culture (Barmeyer 2004). Thus although a student may move to study in another country, they bring with them their own learning styles which will best fit with predominant styles favoured and endorsed by their home culture. If the EU encourages European citizens to move across Europe to improve employability, it is a big challenge for dental educators to be able to provide education that effectively supports students from different cultures who possess different learning styles. It is important to understand the influences of culture (and other factors) on dental education and how best to provide support to dental educators.

Faculty development is used to support educational competence training for educators (Steinert et al. 2006). In-service short course seminars with post-workshop development have been found to be the most effective format for staff development programmes (McCluskey and Lovarini 2005). However, faculty development may not provide comprehensive educational competence development for educators, especially if there is limited training time (Graham et al. 2012). One possible solution is to develop a training programme or curriculum which provides a broad and comprehensive content for developing educational competences which are essential for being effective European dental educators.

1.2 Formulating the Research Question, Aim, and Objectives

1.2.1 Research Propositions

It is clear that the development of dental educators has received little consideration. This problem can compromise long-term development in European dental education, as dental educators are key people within the dental education system. This research project postulates four propositions to rationalise this problem and to devise a potential solution. The research propositions inform the formation of this study's research question, aim and objectives.

Proposition 1: Attention has focused on UG-DentalEduc

European society requires competent dentists to improve and promote its population's oral healthcare. The aim of UG-DentalEduc is to provide competent dental graduates to serve population needs. In order to achieve this aim, a good UG dental curriculum is essential.

The recent development in European dental education primarily focuses on student-related matters (e.g. teaching and learning). People in dental society recognise that such development can provide direct effects and explicit results during the dental education process (e.g. improvement of learning and exam results), or at the end (e.g. graduates who have better skills, knowledge or attitudes). These issues are possibly recognised as the most important indicator for successful dental education.

Proposition 2: Development of dental educators has been overlooked

Dental educators are important people who contribute to the development of dental education in every aspect. They have multiple roles and responsibilities within UG-DentalEduc, all of which are important. However, developing dental educators to be better able to support improving UG-DentalEduc has so far received little consideration. Moreover, the recent strategies to support dental educators to gain educational competences mainly focus on specific skills to serve a particular issue or need, rather than on comprehensive training and development which covers all competences essential for being an effective dental educator.

Proposition 3: A curriculum for dental educators will have widespread benefits

Creating a curriculum for the development of European dental educators can be an effective strategy for enhancing dental educators' educational competence, gaining greater recognition of the role and importance of dental educators, and providing overall benefits for European dental education.

Proposition 4: Contextual factors need consideration

There might be a core curriculum content which can be applied across Europe; however, there are many factors which need to be considered when creating a curriculum for developing dental educators. The relationship between these factors and the curriculum is complex as it varies in different contexts. There might be particular curriculum content which specifically relates to a local context (e.g. educational system, local oral healthcare needs or politics). In order to create a curriculum for dental educators to serve a specific area in Europe, these factors and all relevant contexts need to be recognised.

The summary of four research propositions is shown in Figure 1.1.

Figure 1.1 Diagrammatic presentation of four research propositions.
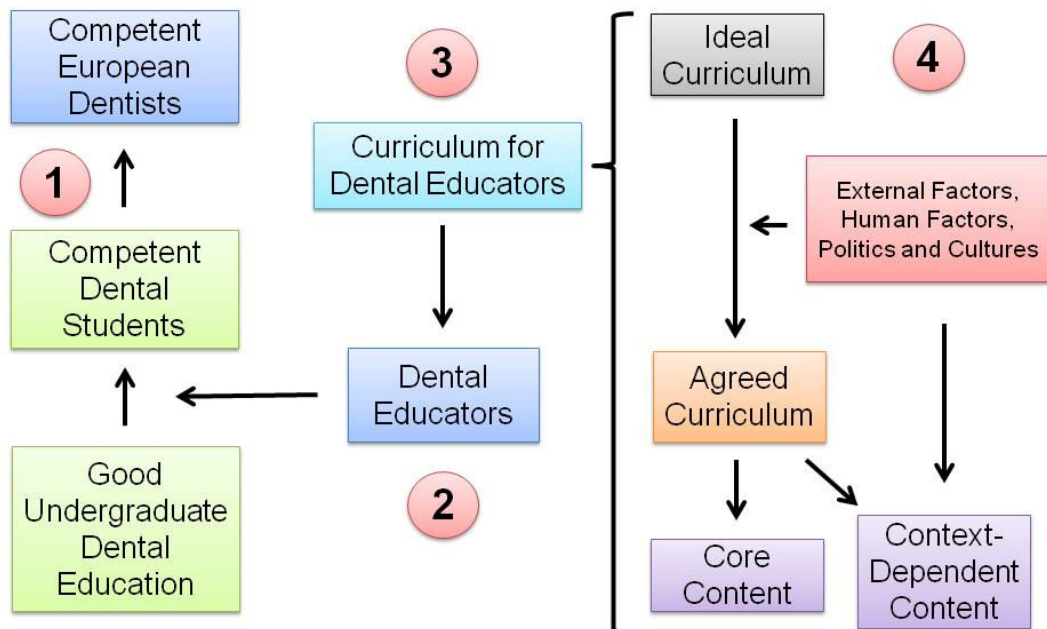
1.2.2 Research Question, Aim, and Objectives

Research Question

What content should be included in an agreed curriculum for educators of dental UG students in Europe?

Research Aim

The aim of this study is to agree upon the content of a curriculum for educators of dental UG students in Europe.

Research Objective

This study has three main objectives:

(1) To identify the core content of a curriculum for developing educators of dental UG students in Europe.

(2) To identify context-specific content of the curriculum which is informed by external factors and local contexts.

(3) To identify factors which influence the curriculum content and need consideration when developing the curriculum.

Chapter 2 Dental Educators and Undergraduate Dental Education

The aims of this chapter are five-fold: to outline a definition of the educators of UG dental students; to identify the nature of UG-DentalEduc; to review a definition of competence and CBE and its implications for dental educators; to identify the components of UG-DentalEduc and how they are relevant to educators; and to present an overview of UG-DentalEduc in Europe within the context of this research. The chapter provides a framework for the later discussion of the research findings.

2.1 Who are Educators of Undergraduate Dental Students?

There are a number of stakeholders who are a part of UG-DentalEduc, including students, educators and support staff, and society. Students are expected to be the key stakeholders because they are mainly involved in the UG-curriculum. However, in order to develop the whole of dental education, people who are able to contribute and link all the components of dental education together are dental educators. They have a variety of roles and responsibility within UG-DentalEduc (Prideaux et al. 2000; Scott 2003b); they could be considered as the key people of UG-DentalEduc.

One description which reflects the roles and responsibilities of dental educators, noted that *"dental educators are employed full or part-time, in a variety of different roles to support members of the dental team"* (Bullock and Firmstone 2008, p. 1). However, this description was based on the PG context, which might not be fully applicable into the UG education. Nevertheless, it is possible to build upon the description above to outline who are educators of UG dental students. In this research study, educators of UG

dental students are 'any staff – who are employed either full-time or part-time, dental or non-dental professionals, academic or non-academic, university-based or non-university-based position – who have a role in supporting the development of professional competence of students in the UG-DentalEduc.' Throughout this research study, this definition is represented in a term as 'dental educators'.

The rest of this chapter focuses on UG-DentalEduc, its components and contexts, and implications for dental educators.

2.2 The Nature of Undergraduate Dental Education

There are few academics who attempt to discover the nature of UG-DentalEduc. Chestnutt and Gibson (2007) note that practice in dentistry requires a high degree of judgement and technical skills. A similar level of skills and judgement are also needed in other professions; for instance, when a doctor performs a minor surgery on patients with complicated health conditions. Fugill (2012) asserts that clinical dentistry involves tacit knowledge which is gradually developed implicitly within individuals. Students require prior knowledge, practical experience, and feedback or guidance from educators in order to make sense of the tacit knowledge and develop deep learning (see Chapter 4). However, this concept does not explain why and how tacit knowledge occurs in clinical dental practice, nor does it indicate if this learning process is unique to dental education. It can be assumed that a similar process might occur in the teaching and learning process of other health professional education (e.g. medical education).

It was claimed by Sweet et al. (2008) that the nature of UG dental practice involves not only the student-educator relationship (i.e. teaching and learning), but also patient welfare and expectation, clinical outcomes, and complex materials and procedures. It is accepted amongst dental

professionals that dental practice mainly involves irreversible procedures and managing the emotional effects on patients (e.g. pain, anxiety). UG dental students spend more time and have more direct contact with patients than other professions (especially medical students who have less direct contact with patients). This notion represents unique characteristics of clinical dentistry, which are different from other professions. However, UG-DentalEduc covers not only clinical dentistry, but also other educational areas (e.g. pre-clinical sciences, self-directed learning), which the above notion has not yet explained.

One factor which introduces a difficulty in defining the nature of UG-DentalEduc is that *"In dentistry, we share cultural practices, beliefs, and expectations that define our profession, but that are 'unwritten rules'. We have a common professional vocabulary."* (Fugill 2012, p. 2). While everyone has a mutual understanding of the unique cultural characteristics of dentistry, nobody can precisely define them, as they have never been written and described explicitly. As such, this nature is a cultural norm where members of the culture mutually accept, follow, and behave accordingly (Hofstede et al. 2010).

2.3 Competence and Competency-Based Education (CBE)

UG-DentalEduc has evolved and transformed from a discipline-focused and largely teacher-centred approach to a competency-based curriculum (CBC). The educational change was a response to several problems within the traditional (discipline-based) curricula. This led to the development of CBE and contemporary educational strategies including: a focus on learning outcomes, vertical and horizontal integration of the curriculum, and authentic assessment (Chambers 1998; Rohlin et al. 1998; Frank et al. 2010b; Harris

et al. 2010). It is important that dental educators understand the concept of competence and CBE which is fundamental to UG-DentalEduc.

2.3.1 The Concept of Competence

2.3.1.1 A Definition of Competence, Competency, and Performance

The words 'competence' and 'competency' have been used inconsistently, and sometimes confusingly. For example, competence is seen as an array of abilities across domains related to performance in a specific context, whereas competency concerns a *particular* ability (Frank et al. 2010b; Taber et al. 2010; Khan and Ramachandran 2012). In this interpretation, competency is a component of competence. In contrast, 'competence' is defined, from a different perspective, as a task-related capability or outcome, while 'competency' is the individual-oriented state (McMullan et al. 2003; Pijl-Zieber et al. 2014). This notion is relevant to the concept of competence as used in dental education in that 'competence' relates to professional performance or behaviour, but 'competency' is a transition state toward expertise (Chambers 1994). Gruppen et al. (2012) accept that the definitions of 'competence' and 'competency' remain controversial and are used interchangeably, but they argue that the terms do in fact share similar characteristics. The terms competence/competency need to be used based on their shared features, rather than their literal definition.

However, there is another term – 'performance' – which is sometimes used interchangeably with competence. While competence is a capability to perform a specific task satisfactorily and with effective decision making, Khan and Ramachandran (2012) argue that performance covers a broader scope; performance is (1) a mixture of knowledge, ability, attitude and (2) influenced by external factors (e.g. patients' behaviours), which are beyond individual

control and acquisition. In contrast, in dentistry, 'performance' is defined as *"a specific sample of ability under specific conditions"* (Chambers and Glassman 1997, p. 665), or *"the psychomotor ability that precedes the skill component of competencies"* (Chambers 1993, p. 792). From this viewpoint, performance only focuses on a narrow aspect (i.e. skill or ability).

In summary, 'competency' is one stage within the process of becoming an expert, 'competence' is a capability which covers a broad scope of professional attributes and 'performance' is a set of skills which a professional performs.

2.3.1.2 The Components of Competence

Competence is a combination of context and underlying attributes that *"include knowledge, skills, attitude, performance, and levels of sufficiency"* (McMullan et al. 2003, p. 285). This interpretation also incorporates ethics and reflective practice. However, the definition of 'competence' still varies by country and profession (Pijl-Zieber et al. 2014). A unanimous definition across the disciplines has not yet been reported. Examples of the definition of competence are presented in Table 2.1.

In dentistry, Chambers (1994) asserts that competence relates to what dental professionals do on a regular basis; it is a combination of performance and knowledge which is supported by professional values. Competence is represented independently in a real professional setting. Regardless of the discipline, it can be concluded that competence is a combination of knowledge, skills, professional attitude, personal attributes, an ability to work independently (without direct supervision), and context. Throughout this research project, the term 'competence' is used consistently to demonstrate the general idea of professional competence and CBE.

Table 2.1 Examples of definition of competence regarding to different disciplines.

Discipline	Definition
Medicine	"The array of abilities across multiple domains or aspects of physician performance in a certain context. Statements about competence require descriptive qualifiers to define the relevant abilities, context, and stage of training. Competence is multi-dimensional and dynamic. It changes with time, experience, and setting." (Frank et al. 2010, p641) "The habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served." (Epstein and Hundert 2002, p226)
Nursing	"A bringing together of general attributes — knowledge, skills and attitudes. Skill without knowledge, understanding and the appropriate attitude does not equate with competent practice. Thus, competence is the skills and ability to practise safely and effectively without the need for direct supervision." (Garside and Nhemachena 2013, p543)
Dentistry	"The behaviour expected of beginning independent practitioner. This behaviour incorporates understanding, skills, and values in an integrated response to the full range of circumstance encountered in general professional practice." (Chambers 1994, p340)
Education	"The ability to perform the tasks and roles required to the expected standard." (Eraut 1998, p127)

2.3.1.3 The Novice-Expert Continuum

According to Chambers (1993, 1998), there are five stages to become an expert: novice, beginner, competent, proficient, and expert. At the beginning of an UG-curriculum, students are in the novice stage. Their learning and development relies on well-structured strategies and direct support from educators. They can then gradually develop foundation knowledge, skills, and values essential for dental practice, to progress to the beginner stage. Students begin to develop decision-making skills and transfer their knowledge and skills into different contexts. In the first two stages, students gradually take more responsibility in their learning.

At the end of the programme, students are expected to be in the competent stage. However, not all competences will be achieved at a similar time. Cate et al. (2010) also highlight that individuals require different amounts of time to develop different skills. There is a variation in the attainment curvature between different skills, as the competent stage in some skills may be accomplished earlier compared to some other skills. Regardless of the variation of skills accomplishment, competent dental graduates need to be able to provide a safe and ethical practice, as well as manage general problems in their practice (GDC 2011).

After several years of deliberate professional practice (practice after gaining a qualification or specialist training), they enter the proficient stage as they gain more in-depth understanding and skills to handle a wider range of professional problems (Chambers 1994). Finally, they could reach the expert stage after more than 10 years of practice. This stage involves the integration and internalisation of professionalism. This model is summarised as a curve of skill acquisitions in the literature (Carraccio et al. 2008; Cate et al. 2010) to explain how individuals develop their competence to achieve different stages of the novice-expert continuum (Figure 2.1).

Figure 2.1 General curve of skills acquisition.
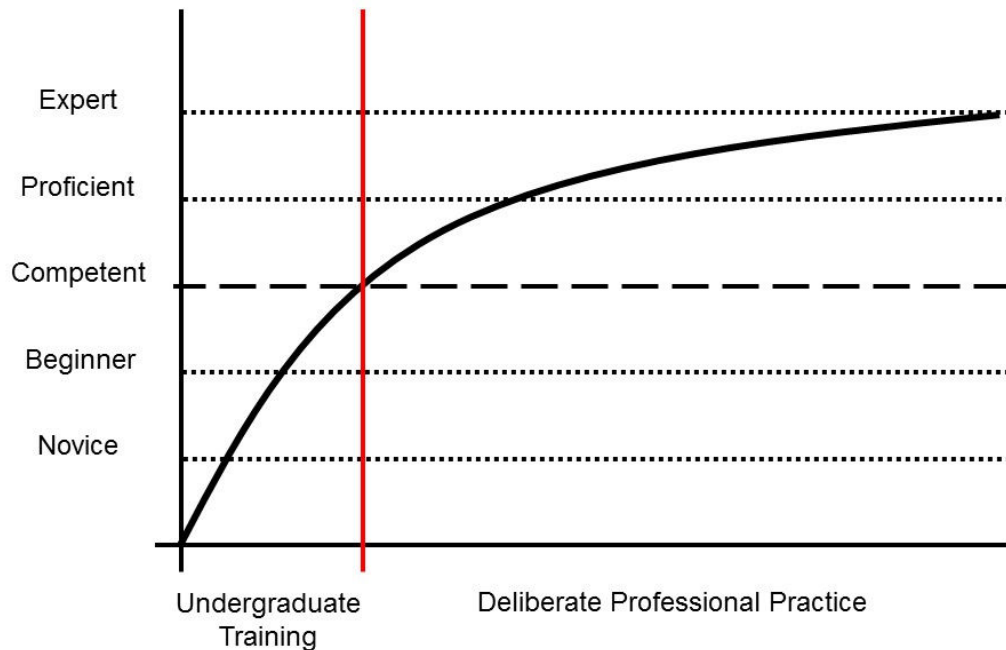
Adapted from (Cate et al. 2010)

2.3.1.4 Is 'Being Competent' Enough?

One of the criticisms of competence as an approach is that students may feel that they no longer have to undertake a particular procedure (e.g. an amalgam restoration), once they have been judged to be 'competent'. As competence comprises of knowledge, skill, and attitude, it implies that these components ought to be maintained at the 'competent' level. While attitude receives little attention, it has been found that knowledge and skill can deteriorate if they are not used or practiced. For the knowledge component, professional knowledge gradually becomes outdated if individuals do not contribute to or acquire knowledge over time (Lysaght and Altschuld 2000). Ecke (2004) explains that knowledge attrition links to several psychological processes of forgetting; knowledge in regular use can be retrieved quicker than less frequently used knowledge.

For the skill component, based on a similar notion, a study of Arthur Jr et al. (1998) found that skill decay (de-skilling) occurs if individuals do not use acquired skills for extended periods of time. Their remarkable finding is that the overall performance of an individual reduces an average of 92% after one year of an initial training. Also the accuracy of skills decreases three times greater than speed of skills.

Obsolescence of knowledge and skill can be caused by lack of frequent use (Madden 2006) or by external factors, including advances in sciences and technology, career development, and organisation structure (Fossum et al. 1986). These factors can create a mismatch between individual competence and the competence required for performing a specific task. It is important that individuals improve or maintain their level of competence in order to effectively perform their tasks (Fossum et al. 1986; Arthur Jr et al. 1998; Lysaght and Altschuld 2000).

2.3.1.5 Implications for Dental Educators

Only three to five years of learning and practice are sufficient for beginning a professional career (Chambers 1998). 'Being competent' does not mean that the dental graduates will not need further practice and development. Education is a journey where being competent is a middle transitional stage, not the end of the journey. Dental educators need to ensure that students do not only achieve the competent stage when they complete UG training – but also to establish essential foundations that enable them to move forward to the higher stages later in their professional career or at least to maintain their professional competences. The roles of dental educators is to help students be able to select, acquire, and update appropriate professional knowledge and skills which are essential for their practice and gain lifelong learning skills to support their professional development and future career (i.e. learning how to learn) (Haden et al. 2006).

The principle of competence can also be applied to dental educators as 'educational practitioners'. In order to be 'competent' in teaching at the UG level, dental educators need to develop and possess fundamental knowledge, skills, and professional attitudes relating to educational practice. For example, at the novice stage (new to teaching), educators need to acquire knowledge in educational principles and develop skills essential for teaching and relating roles. This fundamental knowledge and range of skills are the building blocks for educators progressing to be competent educators.

When gaining competences and experience, dental educators then become 'competent'; they are effective educators who can utilise a broad range of educational strategies to support teaching and learning, recognise their limitations, identify areas of educational improvement, and partake in further development (Lyon 2014). The aim of a training programme for dental educators needs to focus on helping educators gain essential educational competences to achieve the 'competent' stage (i.e. being effective educators). However, the journey continues within a continuum until educators gain notable competence and become experts in educational practice. At this stage, teaching becomes instinctive and intuitive (Lyon 2014). Dental educators should be able to lead development and innovation in dental education. Although the training programme does not aim for the 'proficient' or 'expert' stage, it at least needs to emphasise that being dental educators is an ongoing journey that requires continuous professional development in education. This can help dental educators overcome de-knowledge and de-skilling and help them maintain and improve educational practice throughout their teaching careers.

2.3.2 Competency-Based Education

Similar to 'competence', the definition of CBE varies by disciplines and authors. For example, CBE is described as

> *"an approach to preparing physicians for practice that is fundamentally oriented to graduate outcome abilities and organized around competencies derived from an analysis of societal and patient needs. It de-emphasises time-based training and promises greater accountability, flexibility, and learner-centeredness."* (Frank et al. 2010a, p. 636)

CBE is also a framework for developing and implementing an educational programme (Gruppen et al. 2012). Outcome-based education (OBE) is another educational approach used in several disciplines (notably medicine) which has similar concepts to CBE and has been utilised for decades. OBE is an approach whereby the curriculum is shaped by the outcomes which students need to demonstrate in order to progress (Harden et al. 1999). CBE and OBE sometimes are used interchangeably; however, regardless of the terminology both CBE and OBE share several unique characteristics which benefit health professional education.

Regarding CBE, the societal and patient needs are used to define a set of competences and characteristics of graduates (Chambers 1998; Gruppen et al. 2012). The pre-defined competences and characteristics inform the way curriculum content, modes of teaching or learning and assessment are developed. However, CBE is considered by traditionalist educators as being too simplistic and neglectful of discipline or professional knowledge and expertise as it focuses on competence, relating only to specific needs (Oliver et al. 2008; Frank et al. 2010b; Taber et al. 2010).

Recent literature (Jordan et al. 2008; Oliver et al. 2008; Ramani and Leinster 2008; Cate et al. 2010; Kaufman and Mann 2010) suggests that learning involves a number of factors which need to be taken into account when performing professional practice including cognitive abilities, personal attributes, experience, support and the environment. CBE puts emphasis more on student learning and the learning environment, instead of subject matter (Chambers 1998; Taber et al. 2010). The curriculum, learning experiences, teaching and assessment strategies are organised around a set of learning outcomes which aim to lead to the achievement of competence (Harden et al. 1999; Frank et al. 2010b).

Assessment in CBE highlights minimum performance thresholds which determine the status of being 'competent' (Gruppen et al. 2012). Less emphasis is given to the quantity of completed tasks or their requirements (Chambers 1998). Students might only expect to 'pass' the assessment criteria to achieve the competence (Frank et al. 2010b); this may not encourage students to provide their 'best' performance. However, CBE allows students to gradually take responsibility for their own learning and promotes self-assessment and self-directed learning (Frank et al. 2010a; Frank et al. 2010b). The UG-curriculum should be progressive, moving from one pedagogical approach to another (e.g. didactic to directed self-learning to self-directed learning).

Different students require different time periods for developing competence and individual students need different time periods for developing different competences. In the traditional education, the curriculum and learning activities (e.g. clinical practice) are fixed by a predetermined timeframe, which ignores the fact that students have different rates of learning progression (Taber et al. 2010). CBE de-emphasises curriculum time and provides more flexible learning opportunities to students (Frank et al. 2010a; Frank et al. 2010b). Fast-tracked students have choices of learning activities

to further develop their competence, while slow-progressed students still have opportunities and time to improve the necessary competence which is required for achieving the competent stage (Gruppen et al. 2012).

2.3.2.1 Implications for Dental Educators

Regarding the principle of student-centredness within CBE, it is essential to provide gradually less of a learning structure and offer more opportunities for students to apply multiple approaches to develop competence. Students also require self-assessment of their own performance to inform them of their decision-making abilities. The roles of educators in this context will gradually shift from information providers to learning facilitators who provide support and feedback, enabling students to develop learning and competences (Chambers 1998; Paukert and Richards 2000; Frank et al. 2010b). Dental educators will understand and be able to utilise a variety of educational strategies to support students in a different stage of their development, rather than lean towards only either student- or teacher-centredness.

Traditional methods might be beneficial, especially to students at the early stage of the novice-expert continuum. The issues of both teacher- and student-centredness would therefore be a part of a development of dental educators to be familiar with different educational strategies.

2.4 Undergraduate Dental Education

The term 'undergraduate education' has been used in health professional literature to refer to different contexts. These include the curriculum (teaching, learning, and assessment) (Manogue et al. 2011), competences and characteristics of graduates (Chambers 1998), management and leadership (Oliver et al. 2008), and population healthcare needs which inform UG curriculum development (Haden et al. 2006). However, the exact definition of 'undergraduate education' has not yet gained unanimous

agreement. The aim of this section is to review literature so as to identify components of UG-DentalEduc and implications for dental educators. This can also help understand how dental educators contribute to the UG-DentalEduc and developing an appropriate educational training for dental educators.

In order to identify components of UG-DentalEduc, medical and social science databases were accessed to retrieve literature (from 1991 to present time) on the topic of undergraduate education and curriculum. The search terms were: competenc*, educat*, undergraduate*, curricul*, and dent*, with two inclusion criteria. First, the articles needed to relate to education and health professional education (e.g. medical education, dental education, nurse education, etc.). Secondly, the articles needed to contain information relating to the UG level of education. Articles not published in English language nor providing adequate discussion (i.e. any issue relating to UG education is mentioned but contains no detailed discussion) were excluded. A large number of articles was found by using these keywords. However, only sixteen articles were selected and analysed thematically. A model of UG-DentalEduc was developed (Figure 2.2). Medical education textbooks were used to triangulate and confirm the model. A list of articles and textbooks which were used for developing the model are presented in Table 2.2. According to the literature, UG-DentalEduc comprises three main components: a competency-based curriculum (CBC), institutional issues, and external factors.

Figure 2.2 Components of undergraduate dental education and their relationship.

Undergraduate Dental Education

Competency-Based Curriculum

Competence

Process
Teaching/Learning
Assessment
Support
Resources
Environments
Student Issues

Input
Admission and Selection

Output
Competent Dental Graduates

External Factors

Science and Technology

Research

Health and Patient Care

Educational System

Government Policy and Politics

Socio-Cultural Issues

Workforce

Economics

Institutional Issues

Structures:
Organisation Chart/Departments/Units/Facilities

Functions:
Administration/Evaluation/Quality Assurance/Staff Issues/Budget and Finance

Table 2.2 The literature analysis for developing the model of UG-DentalEduc (with data triangulation from medical education textbooks).

	Author(s)	Discipline	Student Admission	Competence	Teaching and Learning	Assessment	Certification and CPD	Environment	Staff, Curriculum, Evaluation, Institution	External Factors (e.g. Society, Healthcare)
Literature	1. Cate et al. (2010)	M		O	O					O
	2. Chambers (1994)	D		O	O				O	
	3. Chambers (1998)	D		O	O	O				
	4. Divaris et al. (2008)	D			O	O		O		
	5. Frank et al. (2010a)	M		O	O	O				O
	6. Frank et al. (2010b)	M		O	O	O			O	
	7. Gruppen et al. (2012)	Ot		O	O	O			O	
	8. Haden et al. (2006)	D			O	O			O	O
	9. Harden et al. (1999)	M		O	O	O		O	O	
	10. Harris et al. (2010)	M			O	O			O	
	11. Khan and Ramachandran (2012)	M		O		O				
	12. Manogue et al. (2011)	D		O	O	O			O	
	13. Oliver et al. (2008)	D		O	O	O			O	O
	14. Pijl-Zieber et al. (2013)	N		O		O	O			
	15. Sefton (2004)	M	O		O	O			O	
	16. Taber et al. (2010)	M		O	O	O			O	O
Textbooks	1. Dent and Harden (2013)	M	O		O	O	O	O	O	
	2. Dornan et al. (2011)	M	O		O	O		O	O	O
	3. Harden and Laidlaw (2012)	M	O	O	O	O		O	O	

M = Medical literature
D = Dental literature
N = Nursing literature
Ot = Other discipline

O = It is discussed in the literature

2.4.1 Competency-Based Curriculum

The curriculum is a dynamic component which includes three inter-related parts that have a direct relationship with the students: input, process, and output. Competence is the core issue which informs the development and implementation of the curriculum and its components. Competence can be used to set the admission and selection process, so as to select students who have desirable attributes and have the potential to complete the educational programme (Sefton 2004). While dental schools aim to attract the best students into their programme, how individuals become dental students through the admission procedure (national or institutional examination) or selection process (e.g. interview), still varies depending on the regulations of individual countries (Kravitz et al. 2014).

Competence also informs curriculum design and development, teaching, learning, and assessment (the basic building blocks of the 'process' element of the curriculum). Students gradually develop competence through a variety of educational strategies and by optimising their personal learning styles and preferences (Oliver et al. 2008). Their development is assessed against the desired competence. Resources and constructive environments are provided to enhance student development and to support students with difficulties (Haden et al. 2006; Manogue et al. 2011). At the end of the programme, dental graduates are able to demonstrate that they possess the essential competence for being safe and ethical dental practitioners or are ready for the next stage of their training.

Other issues which have significant association to the curriculum include ethical environments, student issues (e.g. stress and diversity), and the relationship between students and educators (Sefton 2004; Divaris et al. 2008).

2.4.2 Institutional Issues

The second component is institutional issues, which covers both structure (e.g. departments, units) and functions (e.g. administration, finance, staff development). Also recent research or publications regarding dental education cover a wider area including faculty recruitment, faculty development, organisation management and leadership (Sukotjo et al. 2010). These aspects have been acknowledged as essential matters for UG-DentalEduc development (Oliver et al. 2008).

In the medical profession, the World Federation for Medical Education (WFME 1998, 2012) has established standards for quality improvement and the accreditation of a medical school which also covers several institutional aspects including vision and mission, academic faculty, and governance and administration. Although no relationship between each area is explained, it reveals that institutional aspects are also an important part of an UG education.

2.4.3 External Factors

There are external factors which impact on dental education (Haden et al. 2006; Divaris et al. 2008). These factors include research and advances in sciences and technology, policy related to evidence-based healthcare, and inter-professional working context. For instance, the need for evidence-based healthcare requires educators to keep knowledge up to date and implement research into practice and teaching (Hand 2006). To overcome the challenges by external factors, educational approaches that highlight student-centred learning and reflective practice are essential for developing students' essential skills for lifelong learning (Edmunds and Brown 2010; Dornan et al. 2011). A variety of pedagogic training programmes can improve teaching and learning, and help educators be able to deal with changes in dental education (Licari 2007). These examples suggest that external factors (as mentioned above) impart a high impact upon UG-DentalEduc.

2.4.4 Implications for Dental Educators

The model of UG-DentalEduc (Figure 2.2) provides a means of understanding how the components relate to and influence each other. It also provides a broader scope of dental education beyond the dental curriculum. Concerning the contribution of dental educators within this model, it is possible to classify the roles of dental educators into three aspects: the roles within the curriculum, the roles at the institutional level, and other roles relating to UG-DentalEduc. The first category includes: supporting student learning; utilising a variety of educational and assessment methods to help students develop different competences; creating and promoting positive learning environments; planning and developing courses, modules, or a curriculum; and getting involved in student admission and selection process. The second category focuses on the managerial and leadership roles of dental educators in developing a dental school and dental education. The last category would include working for professional bodies, contributing toward oral healthcare, and conducting research and innovation in dental education to inform educational practice and policy.

The above classification implies that developing dental educator competence in all three categories needs consideration. However, recent educational training programmes for educators only focused on knowledge and skills relating to the first category (e.g. how to teach and how to assess student learning) (McLeod et al. 2003; McLeod et al. 2008), while other competences relating to the UG teaching were largely ignored. An appropriate training programme for dental educators that covers all three categories of their roles within UG-DentalEduc is yet to be identified and developed.

However, this model of UG-DentalEduc only focuses on the UG context. It cannot illustrate the whole continuum of dental education, which also includes PG education, continuing professional development, and career pathways. Additionally, different countries have their own unique cultural

backgrounds and social systems (Hofstede et al. 2010). This model only outlines the general view of UG-DentalEduc, and may not cover particular aspects which relate to localised contexts.

2.5 European Dental Education

2.5.1 Odontology and Stomatology

The development of dentistry as an independent discipline began in 1782, when dentistry was separated from surgery (Bánóczy 1993). This situation forced dental education to develop along two different pathways; odontology (or dentistry as an independent discipline), and stomatology (or dentistry as one of many specialities of medicine).

With regard to the odontology pathway, its principles stemmed from two assumptions. Only those necessary medical sciences should be taught for dentistry; and there should be integration of teaching and learning among medicine, dentistry, and human biology, while dentistry should have its own autonomy (Bánóczy 1993). The characteristics of an odontology programme are that the curriculum is mainly dentally-oriented and it may have little linkage to medicine (Hobdell and Petersson 2001). Currently most European nations have already changed their UG dental curricula from stomatology to odontology through the European HE harmonisation process (Bánóczy 1999).

The question of the quality of a programme and the competence of graduates from both traditions is controversial. Dental graduates from stomatology programmes should have more competence in providing primary healthcare, which requires holistic approaches; while graduates from the odontology tradition (which has less medical content) might not be able to deal with

patients with complex medical issues. On the other hand, odontologists would definitely have high levels of dental-related skills and they should be more competent in providing general dental healthcare – while stomatologists may lack skills and competences in providing primary dental healthcare. Stomatologists themselves might be de-skilled in medicine when they do dental practice more than medical practice for a long period. According to this notion, it may not be possible to determine which tradition provides better educational quality, because dental education depends on the ethos or philosophy of an individual school or university.

2.5.2 Higher Education and Dental Education in Europe

The European Union (EU) was established in 1993 with an important aim to strengthen its economic market and global competitiveness (Pechar 2007). Regarding Higher Education (HE), in 1999 29 European countries signed and committed to the 'Bologna Declaration', which is generally recognised as a major change in European HE. The Bologna Declaration states that it is *"an agreement among the education ministries of all participating countries to create the EHEA by 2010"* (Pechar 2007, p. 112). The purposes of the EHEA are to strengthen the international competitiveness of HE in Europe, and to increase the mobility and employability of European citizens. The implementation of the Bologna Declaration is defined as the "Bologna Process" (Oliver and Sanz 2007, p. 309).

Concerning the dental profession, a landmark in the history of dental education development in Europe was in 1978 when the EU Council Directive launched the Directive 78/687/EEC, which describes a list of subjects which provide a dentist with the necessary skills for dental practice (Bánóczy 1999). Although it does not provide the exact number of teaching hours for each subject, the directive enabled dental schools to develop common rules, requirements, and educational contents for their UG dental curricula (Anneroth 1989; Bánóczy 1999). Since the 1980s, most

stomatology schools have gradually switched their curricula to odontology in order to align themselves with the Western tradition, and so achieve the common goal of the EU (Scott 2003a). However, these developments have not yet fully affirmed EU policies (gaining mobility, improving employability, developing a comparable degree), as there are several divergences in dental education among European countries, especially in assessment and examination methods (Shanley et al. 1997; Albino et al. 2008; Manogue et al. 2011).

Since 1999, the Bologna Process has enabled progressive improvements in dental education in Europe through the DentEd project – whose major aim was

> *"to facilitate and assist dental schools achieve higher standards in UG-DentalEduc, science and scholarship through pooling intellectual resource, sharing experiences, exchanging and promoting better understanding of education and training in the context of regional priorities and resources"* (Shanley et al. 2002, p. 187).

The DentEd project assisted dental curricula in Europe to gradually converge towards European standards (Shanley, 2007). The results were the establishment of a curriculum model, characteristics of a European dental graduate, an educational quality improvement system, and other educational issues relevant to the principle of Bologna Process (Murtomaa 2009). This project was merged into the Association for Dental Education in Europe (ADEE) in 2007. ADEE played a major role in supporting the DentEd project during its implementation, by acting as a representative of European dental schools and reflecting the European view of dental education at a global level (Hobson 2009; Cowpe et al. 2010).

2.5.3 Implications for Dental Educators

Regardless of the extensive development of HE and dental education in Europe, the issue of dental educators and their development has not yet been fully recognised. However, the dental education conference in Dublin (1984) and the workshop in Moscow (1988) mentioned dental curricula and the characteristics of desirable dentists, which may be relevant to dental educators (Oliver and Sanz 2007). These events implied that the roles and responsibilities of dental educators in the development of dental education were considered as an integral part of the whole curriculum development process.

The Directive 78/687/EEC and other relevant documents may indirectly relate to dental educators. However, the characteristics and roles of dental educators on European dental education development were not recognised. Similarly, several dental education developments have been conducted since the Bologna Process. It is notable that many issues (e.g. profile and competences of dental graduates, curriculum structure, and QA system) have received much consideration in order to improve dental education to meet the European standards. However, the issue of dental educators is yet to be fully considered.

It is highly possible that educational strategies between odontology and stomatology traditions are different because they are based on completely different curriculum structures. It possibly infers that dental educators in both schools should have different profiles and educational skills in order to support the particular characteristics of each tradition. Dental schools in many countries still have stomatology-based resources and systems. It is questionable whether knowledge and competences (both in dentistry and education) based on a stomatological approach can be fully adapted to odontology. However, an aim of dental education (for both traditions) is to develop dentists who are able to provide the best oral healthcare to the

population (Bánóczy 1999). If the educational goals of both programmes are similar, then dental educators in both schools should have shared common characteristics, in order to educate dental students. A common educational training programme that is applicable to dental educators in both traditions is essential.

Dental educators have several important roles in the UG-DentalEduc. They have responsibilities in providing appropriate educational strategies which allow students to develop essential competences. They are key people who develop new knowledge and implement research into practice. They are an important part of curriculum development, educational management, and educational quality improvement. If these roles lack attention and are not included in any policy or development, then it follows that the quality of European dental education may be compromised and the development of dental educational systems might not be fully achieved. In the next two chapters, the roles and competences of dental educators will be discussed in order to help to develop a training framework for dental educators in Europe.

Chapter 3 Roles and Competences of Dental Educators

The previous chapter, has demonstrated that the structure of UG-DentEd is complex with a number of institutional and external issues. The term 'dental educators' in this study represents a broad range of educators who contribute to the support of UG dental students. Educators may adopt a variety of roles and responsibilities; however, regardless of their roles they need to be competent educators. Regarding the novice-expert continuum, educators require training and development to progress from the first two stages (novice and beginner) to achieve the competent stage (Lyon 2014). At this stage educators need to possess a wide range of educational competences to perform different roles. The aim of this chapter, thus, is to outline common roles of dental educators and competences for being effective educators through reviewing and analysing the literature. It attempts to address two main questions: (1) what are the key roles of dental educators in UG-DentEd and (2) since educators can have different roles, what competences do they need to possess in order to be effective dental educators? The chapter comprises two sections focusing on roles and competences respectively.

3.1 Roles of Dental Educators

3.1.1 Variety of Roles of Dental Educators

Several educational movements have influenced the development of dental professionals. These include evidence-based dentistry, which aims to provide the best practice based on sound scientific evidence (Winning et al. 2008), and CBE which is generally believed to enhance the quality of dental graduates for society than a traditional philosophy (e.g. discipline-based

education) (Hendricson and Kleffner 1998; Oliver et al. 2008). Dental education needs to ensure that graduates are competent and able to provide safe and best practice to serve the society (Chambers 1998). Dental educators thus need to develop and deliver high quality education to support student learning and development through different roles. Several studies have delineated the roles of educators. For example, the study by Hand (2006) classifies academic dental educators into three categories:

(1) Clinical Teacher – their role include teaching in a clinical setting.
(2) Clinical Scholar – their role involve teaching, clinical practice and additional research.
(3) Research-Intensive Scholar – their role focuses on research and innovation and supervising PG students.

Although the study focused on clinical teaching and research roles, the author also reviewed and mentioned that healthcare and managerial/administrative roles are an important part of dental faculty. However, these roles were seldom discussed in the study.

Scott (2003b) proposes that clinically-qualified dental educators in a higher education context usually have four main duties:

(1) Teaching – involves classroom-based and/or clinical-based education.
(2) Research – focuses on developing new knowledge in a particular area.
(3) Clinical Practice – includes providing oral healthcare to the patients and/or taking responsibility for student practice.
(4) Miscellaneous – includes course development, school management, and contribution to professional bodies.

However, some educators are not clinicians and do not get involved in clinical teaching. They may only supervise student research projects. Supervision entails the provision of guidance and support for students to

develop necessary knowledge and skills (Launer 2010). Thus, supervision can be thought of as a part of a teaching role. This implies that non-clinical research educators also possess teaching roles that are ignored by both Hand (2006) and Scott (2003b).

In the medical literature, Bligh and Brice (2009) propose that regardless of their responsibilities, the roles of educators mainly involve three aspects: teaching, research, and management. The study by Harris et al. (2007) showed that academic competences of the medical faculty can be categorised by roles into four groups: (1) teacher-administrator, (2) teacher-educator, (3) teacher-researcher, and (4) teacher-clinician. Alternatively, Srinivasan et al. (2011) categorised roles of medical teachers into core teacher roles and specialised roles. The former includes clinical teacher, small group teacher, and large group teacher; the latter covers programme administrator, technology developer, educational researcher, institutional administrator, and policy maker. However, none of these proposals provides detailed information of the roles.

The major limitation of the above literature (both dental and medical) is that it only covers the roles within a higher education context. The literature may not fully represent a complete range of the roles of dental educators because dental educators could be any individual who contributes in developing UG dental students (see Chapter 2). However, regardless of the context, the literature reveals an essential point that any educator has a duty and needs to contribute in teaching or developing students. It implies that 'teaching' is the main role of all educators. However, it could be argued that sometimes when an academic becomes more senior they take less interest in teaching in UG education.

In addition to teaching, educators may have to devote their time to (1) improving provision of healthcare needs, (2) research, which is vital for their career development and (3) managerial roles (Scott 2003b; Harris et al. 2007). These three roles can be considered as a part of the educator role. Nevertheless, educators are not expected to perform every role; instead, in universities they would normally be expected to get involved in at least two roles relating to their career (e.g. teaching-research, teaching-management) (Bligh and Brice 2009). Table 3.1 demonstrates different roles of educators presented in the literature, which are summarised into four main roles: teaching, research, administration, and providing healthcare. The details of these four common roles will be discussed in turn.

Table 3.1 Roles of educators represented in the literature.

Roles	Teaching	Research	Administration	Providing Healthcare
Prideaux et al. (2000)	• Medical Expert • Communicator • Collaborator	• Scholar	• Manager	• Healthcare Advocate
	Profession (integrated into all roles)			
SREB (2002)	• Teacher	• Scholar	• Collaborator	
Scott (2003b)	• Teaching	• Research	• Miscellaneous	• Clinical Practice
Hand (2006)	• Teacher • Mentor	• Scholar/Researcher	• Discipline Leader • Curriculum Developer • Information Manager • Committee Member	• Clinician
Harris et al. (2007)	• Educator	• Researcher	• Administrator	• Clinician
Bligh and Brice (2009)	• Teacher	• Researcher	• Manager	
Srinivasan et al. (2011)	• Clinical Teacher • Individual/Small Group Teacher • Large Group Teacher	• Educational researcher	• Program Administrator • Technology Developer • Institutional Administrator • Education Policy Maker	

3.1.2 Educator-Teacher

The role of educator as teacher has been discussed in several studies. Branch et al. (1997) state that the role of clinical educator involve several duties including conveying knowledge to students within the clinic; being good practitioner role-models; and possessing professional qualities. Educators should be experts who have good communication skills (Prideaux et al. 2000). Content expertise from educators provides students with new knowledge and helps them to correct misunderstanding (Azer 2005). Effective communication is important for educators in supervising students and providing them with constructive feedback for further development (Ramani and Leinster 2008).

However, educators need to be aware of external factors (e.g. inequality of power, social relationship) that can compromise the feedback process (Higgins et al. 2001; Weaver 2006). For instance, educators might assume that students will passively receive feedback while students expect the open discussion from educators. This situation could leave students angry, demoralised, or fear of patronising. Educators need to ensure that they are approachable and allow students to express their feeling/concern to negotiate on any learning issue.

Students can learn how to develop a positive relationship with patients and other stakeholders by observing educators' approach to these people (Fugill 2012). Indeed, professional behaviours and attitudes can be transferred to and learned by students through educators being good role models. This suggests that role modelling (and supervision) could be classified as a part of 'teaching' roles in clinical setting.

Educators can also provide teaching in different settings including classroom-based, laboratory-based, or outreach/community-based (Harden and Crosby

2000; Srinivasan et al. 2011; COPDEND 2013a). However, some roles may intersect with practical teaching; for instance, in a small group session, educators need to be not only 'learning facilitators' who support student engagement and discussion within a group, but also 'information providers' who provide important information or instruction which helps students to continue their discussion and develop further learning.

Another issue relating to the teaching role is that it has been recommended that UG-curricula across Europe should support student development of evidence-based practice (Winning et al. 2008; Manogue et al. 2011). Dental graduates need to possess lifelong learning skills and be able to apply evidence to their practice (Cowpe et al. 2010). This set of skills is also important in other health professions globally (e.g. Frank 2005; APC 2006; Harris et al. 2007). The role of educators is to support students developing critical appraisal skills and how to apply evidence into practice (Hand 2006; Bligh and Brice 2009).

In summary, teaching roles may play out in learning contexts within and outside clinical settings. For clinical teaching, the role of educators includes transferring knowledge, supervising and supporting student learning, and assisting students to develop professional behaviours and attitudes through role modelling. In other learning contexts, educators have a range of roles that primarily involve facilitating and helping students develop essential knowledge and competence. Dental educators therefore need to develop competences relating to these activities to become 'effective teachers'.

3.1.3 Educator-Researcher

Research is another role in which educators may get involved. Educators have to apply evidence into practice as well as develop and disseminate new knowledge to the professional society (Straus et al. 2005; Heflin et al. 2009).

It is generally understood that career progression and promotion for university-based educators is reliant mainly on research, publications, and obtaining grant funding (Smesny et al. 2007). However, teaching excellence has been increasingly accepted as another indicator for career promotion, for example in the UK (Dearing 1997), and some UK universities have provided a teaching-focused (Teaching/Scholarship) career pathway. However, research still receives more attention and influences career development. Educators, regardless of their career pathway, need to balance both teaching and research roles. It needs to be stressed that research is not directly relevant to educators outside academia and may not contribute to their career development. However, research into aspects of dental education is still a neglected area.

In short, the role of educator as 'researcher' primarily relates to 'teaching' roles. Regardless of their main career, educators need to link research into teaching and enable students to develop lifelong learning skills.

3.1.4 Educator-Administrator

Educational administration is another role that covers day-to-day organisational responsibilities and tasks. When educators have more teaching experience, their responsibilities could gradually expand from a teaching session to the organisation of a whole course/programme/curriculum; skills in management are fundamental for these responsibilities (Bligh and Brice 2009). Additionally, advances in dental education require systematic processes to assure the quality of education (Jones et al. 2007). Educators have to be involved in the quality assurance system and administrative tasks appropriate to their routines.

The administration role is a compulsory duty for many educators. In terms of teaching, most educators will be involved in management at an individual

level (e.g. organising a teaching session) while some educators contribute at a higher level including managing a curriculum or making educational policy (Bligh and Brice 2009). In addition, educators who provide clinical practice also need to manage patients and healthcare systems while educators who are responsible for research also need to manage research projects, processes, and funding (Prideaux et al. 2000; Hand 2006). This implies that educators, regardless of their working context, usually get involved in the administrative role which could directly or indirectly result in consequences for students (e.g. individual learning or the whole cohort).

The above discussion reflects that the 'administrator' role has a relationship with the 'teacher' role; it is fundamental to dental educators. However, similar to 'Educator-Researcher', not all educators have to possess administrative roles as it depends on individuals' job description. These roles may be relevant only to experienced, university-based or senior educators.

3.1.5 Educator-Healthcare Provider

Educators may need to provide oral healthcare to patients in the dental school/hospital as a part of their roles. In clinical teaching, if an unforeseen serious circumstance should occur (e.g. patient injury caused by a student) clinical educators may need to take charge of the procedures in order to recover the situation. In these circumstances, the role of educators is not only to supervise students, but also to ensure safe procedures for the patients. Sometimes educators need to take a practitioner role even when they are in the teaching context. It is important that educators (1) possess knowledge and skills in patient care and the healthcare systems and (2) help students to develop skills which relate to the healthcare level (e.g. communication and teamwork) (Strauss et al. 2010).

The role of educator as 'healthcare provider' not only assists students to develop learning, but may also improve the societal oral healthcare. However, as not all dental educators are healthcare providers (e.g. basic sciences educators), the role 'healthcare provider' may not be relevant to some educators.

3.1.6 Relationships between the Four Main Roles

Educators need to demonstrate at least two roles so that one role can complement another role (Bligh and Brice 2009). When working in academic environments, dental educators have a wide-range of responsibilities/duties which requires a variety of competences (Scott 2003b; Hand 2006; Harris et al. 2007). However, Hand (2006) suggested that individual dental educators do not have to be competent in all areas, instead they need to have competences which forms the basis for further development should they take responsibility in specific roles.

In summary, the balance of four main roles will vary by individual. Regardless of the roles they perform, dental educators have to possess competences which could help them to balance their roles and be effective educators. In the next section, competences relating to the four major roles of dental educators are reviewed and discussed.

3.2 Competences for Dental Educators

3.2.1 Review of the Literature on Competences for Educators

A plethora of studies in health professional education has identified knowledge and skills deemed necessary for the roles of educators. However, few have explored comprehensive competences that relate and cover all four main roles of dental educators. In this section, the literature from different health professional disciplines will be reviewed in order to identify competences for educators that are essential for teaching at the UG level and relevant to the four main roles.

3.2.1.1 The Dental Literature

Despite the extensive development of competence within the UG-DentEd since the 1990s (Chambers 1993), only few studies have attempted to explore teaching competences for dental educators. Hand (2006) identified competences in scholarship of teaching and learning and in scholarship of discovery for dental educators. Competences that are important for teaching include educational theories and principles, educational strategies for supporting different learning styles, teaching in different settings, assessing student learning, and curriculum and evaluation. Competences for scholarship of discovery mainly relate to the ability to do and manage a research project. However, the study by Hand (2006) explored only two aspects of the educator's role – teaching and research; competences for the administrative and healthcare roles relating to the teaching role were not identified.

3.2.1.2 The Medical Literature

In the medical education literature, Irby (1994) developed a model for clinical teacher knowledge. This model represents six domains of knowledge that are necessary for clinical teaching: medicine; patients; context; learners; general principles of teaching; and case-based teaching scripts. The author argues that as knowledge of medicine only is insufficient for clinical teaching, there is a need for knowledge of teaching and learning to effectively deliver knowledge and allow students to develop and organise learning. This model provides a traditional perception that educators need content expertise and educational principles for transferring knowledge and developing student's learning. As clinical teachers are mainly involved in clinical education, this model is applicable to their roles. However, in other settings (e.g. small group teaching), educators may require content expertise over educational skills (Davis and Harden 1999; Dolmans et al. 2002) albeit that sometimes non-experts who have good facilitation skills could better help students develop learning (Hendry et al. 2002). Additional, there are also other domains of knowledge which are important for the teaching role including knowledge of communication and curriculum (Gonzalez et al. 2013). This model may not be beneficial on how to balance between content expertise and educational skills in order to indicate what educators need to know.

From a broader aspect, Harden and Crosby (2000) identified competences for educators in 12 areas. This study provided a comprehensive view of competences which educators involved in teaching need to possess. However, the competences of other roles (e.g. research, management) relating to teaching roles are not explored. Moreover, this study mainly emphasised behaviours of educators (i.e. how educators provide good teaching) rather than illustrating the educational knowledge that educators need to possess. This study did not answer why educators need to demonstrate these behaviours and why these behaviours are important.

According to McLeod et al. (2003), it was believed that a good way for developing educational competences is the apprenticeship where junior educators learn how to teach from experienced educators; although, arguably junior educators could also learn to perpetuate poor teaching behaviours from some experienced educators. Additionally, the majority of educational research aims to identify teaching behaviours for supporting student learning. The authors noted that recent training or faculty development programmes only emphasise effective teaching behaviours. This leads to the current problem that educators know 'how to teach,' but they do not know 'principles/theories underpinning how to teach'. The McLeod study raises awareness of the importance of both knowledge and skills in education in order to provide sound educational strategies to support student learning.

From the experiential learning perspective learning is developed from reflection and understanding of experience and context (Sandars 2009). Learning 'how to teach' and experience in teaching, via apprenticeship, might enable educators to systematically reflect on their experiences leading to the understanding of the context and how a specific behaviour works in different situations. In this way knowledge of teaching and learning is gradually developed. However, from a constructivist viewpoint, prior knowledge acts as a scaffold for developing new learning. Prior knowledge allows learners to link and apply what they know in combination with new information and identify learning goals in order to fulfil their learning gaps (Jordan et al. 2008). This suggests educators need basic knowledge in teaching and learning to gain insight of contexts, experience and develop educational competences so as to understand 'how to teach' (i.e. developing teaching behaviours). On balance, educators require both educational knowledge and effective educational skills/behaviours.

As a result, McLeod et al. (2003) separated pedagogical knowledge of clinical teaching into four areas: curriculum; how adults learn; helping adults learn; and assessment. Such knowledge allows educators to understand the educational basis of teaching and provides support on 'how to teach'. However, this study mainly highlights the role of clinical teaching and overlooks other roles of educators. Additionally, educators require not only educational knowledge and skills, but also positive attitudes and other attributes which are necessary for competences in teaching. This study did not explore the latter issues in detail.

Hesketh et al. (2001) used an outcome-based approach as a tool to identify competences of clinical educators and proposed a three-circle model which can be used as a framework for developing educators. This model consists of:

(1) Performance of tasks – including teaching and learning, assessing learners, evaluation, and curriculum planning.

(2) Approach to tasks – indicating knowledge, skills, and attitudes which are the basis of the academic profession (e.g. intellectual and emotional intelligence).

(3) Professionalism – relating to professional roles and personal and professional development.

This model identifies important competences of medical educators regarding to their personal attributes and the tasks which relate to learners. It infers that educational competences and positive professional attitudes are the main characteristics of effective medical educators. However, as already discussed in Chapter 2 educators can be non-clinicians and may have other roles that influence the teaching roles. This study only focused on clinical educators and did not acknowledge the above notion; hence, the application of the model is probably limited.

Harris et al. (2007) emphasised the need to identify which academic competences can be used to develop the teaching skills of staff in the faculty. Using a consensus method they proposed seven core competences for the medical faculty: leadership, administration, teaching, research, medical informatics, care management, and multiculturalism. While the core competences are essential for all medical faculty, the authors also identified role-specific competences which are dependent on specific roles and responsibilities of faculty. This study provides a comprehensive view of competences for educators. However, the core competences mainly emphasise the practical aspect (effective teaching strategies) and do not highlight the theoretical aspect (what underpins the effective teaching). Moreover, the competency model only represents the nature of medical faculty. Although medicine and dentistry are similar in terms of the health professional, they have their own clinical, educational and cultural aspects which need consideration. It could not be generalised that this model is fully applicable for dental educators.

The study by Heflin et al. (2009) identified a clinical-educator curriculum for residents (newly graduates in training for being registered medical practitioners) who are interested in the teaching career. The curriculum comprises four main areas: clinical teaching, curriculum development, administration and educational scholarship. Each area provides learning goals, learning opportunities, assessment methods and learning resources. The authors assert that recently the healthcare system demands that physicians perform in many roles (e.g. clinician, administrator, teacher), so the curriculum the authors developed is useful for developing residents to support teaching and learning in the clinical setting. Residents who are interested in teaching roles need to possess all competences stated in the curriculum model.

The strength of this study is that it provides all the essential components of the curriculum (competences, how to teach, how to assess, and how to find resources) while most studies identified only competences for effective teaching. However, the study results may not be entirely applicable to dental educators. It represents the curriculum for residents whose main duties involve healthcare practice rather than teaching. Furthermore, residents probably provide only clinical supervision to UG students while educators have a wider-range of clinical and non-clinical teaching roles. The study results do not cover all teaching aspects for educators. Additionally, the study only focused on internal medicine discipline in the USA context. It may not represent the nature of teaching in 'dentistry' nor the European context.

Molenaar et al. (2009) developed competences for medical teachers. Their competency model comprises three dimensions. The first dimension is the teaching domain which covers six essential educational aspects: development, organisation, execution, coaching, assessment, and evaluation. The second dimension is the organisational level which separate into three sub-levels: micro, meso and macro. The last dimension is competences which compose of educational knowledge, skills, and attitudes. The authors believe that regardless of teaching contexts, the teaching role may be similar in every professional setting. General competences proposed by this model might be applicable across health professional education. The model could be used by educators at different levels (e.g. UG and PG level) because each individual educator usually contributes to teaching at many levels.

However, arguably, the assumption proposed in this study may not be fully defensible as context and culture vastly influence teaching and learning (Harden and Crosby 2000; Hofstede et al. 2010). Practically, educators in different contexts or cultures may require different educational competences in order to perform their roles effectively in their context. It implies that dental

educators need to possess competences which are different from educators of other health professions due to the specific nature of dentistry (see Chapter 2). Moreover, the expert panel in this study comprised eight medical educators, one dental educator, and one veterinary educator. The balance of the panel may have biased the results leaning towards a model for medical educators rather than dental educators and hence may not applicable for dental educators.

Srinivasan et al. (2011) developed a common framework for medical educators which consists of two sets of competences: (1) core competences (medical and content knowledge, learner-centeredness, professionalism, communication, practical-based reflection, and system-based practice) and (2) specialised competences (programme design and implementation, learner and programme evaluation, leadership and mentorship). In this model, educators with direct teaching roles need to be competent in core competences, but only be familiar with specialised competences. In contrast, educators who have specific roles need to be competent in specialised competences which relate to their roles and be less competent in core competences. The authors claim that the framework, which was developed from sound and meticulous ground work, covers competences of educational roles across the medical education continuum. However, similar to several studies, the framework was developed based on the UG medical education context whose the nature is different from UG-DentEd. The framework might not be completely applicable in dental education and compatible for developing dental educators.

In addition, although the competency model of Molenaar et al. (2009) and of Srinivasan et al. (2011) provide a comprehensive scope of competences for educators, they mostly concentrate on three main roles, (teacher, researcher and administrator) but ignore another crucial role – providing healthcare – which also influences the teaching roles.

3.2.1.3 The Professional Standards

Several standards for educators published by different professional bodies (SREB 2002; NLN 2005; AoME 2010, 2011; HEA 2011; London Deanery 2012) have provided sets of competences for educators. However, the issue of applicability still needs consideration because they mainly emphasise competences for 'clinical educators' and could not fully represent every aspect of the teaching role of educator or explicitly illustrate competences of other roles which influence the teaching role.

Bullock et al. (2010) developed a set of guidelines for PG dental educators to clarify their educational roles and identify development needs in order to be able to provide good education and training. These guidelines consisted of eight domains that cover competences including educational theory, professional development, and professionalism. Competences which relate to research and healthcare are integrated into several domains. Competences in management are partially integrated into all domains and presented in a separate domain (which emphasises specific management skills).

The above guidelines have been revised and are now available as 'standards for dental educators' (COPDEND 2013a). The standards comprised core values and five core knowledge domains (teaching and learning, assessing the learner, guidance for personal and professional development, quality assurance, and management); these are fundamental and required of all educators. The standards are categorised into two levels: level one is required for dental educators, and level two is required for a leader or manager of dental education.

These standards could be applied to dental educators working in different contexts. However, UG students are novice learners who need appropriate

and adequate support for their learning, so an educator is mainly involved in providing learning direction and controlling learning environments to allow students to effectively develop their competences (Paukert and Richards 2000). Educators for UG students may need to possess competences that are relevant to the UG context. The standards have not acknowledged this notion. In light of the above, the COPDEND standards have proposed general competences that any dental educator, regardless of their role, needs to possess; however, educators also need particular competences in order to deliver effective education at the UG-DentEd.

3.2.2 The Summary of Competences for Effective Educators

The literature discussed in section 3.2.1 reveals that competences for effective educators need to cover all aspects relating to the teaching role regardless of the profession and contexts. These competences could also be used as a basis for providing effective education at the UG-DentEd. Table 3.2 below represents core competences that dental educators need to possess (derived from the literature). The first five domains discuss competences that relate to the micro-level of education (e.g. educational principles and strategies, students' issues, and assessment). The sixth and seventh domains give the details on competences at the macro level (e.g. educational programme and curriculum). The eighth domain informs the competences that relate to utilising, developing, and producing education research to support teaching. The ninth, tenth, and eleventh domains demonstrate competences in management, leadership, quality assurance, and patient care and health system that are fundamental for the teaching roles of educators. The last domain outlines the personal and professional attributes that are essential for being good educators (i.e. professionalism).

Table 3.2 Competences for educators emerged from the literature

Areas of Competences	Educational Theories and Principles	Modes of Education	Learner's Issues	Educational Materials and Instructional Design	Assessment and Feedback	Curriculum	Evaluation	Educational Research	Educational Management	Quality Assurance	Patient Care and Healthcare System	Educational Professionalism
Irby (1994)	O	O	O			O					O	O
Harden and Crosby (2000)	O	O		O	O	O	O					
Prideaux et al. (2000)	O	O	O		O			O	O		O	O
Hesketh et al. (2001)	O	O		O	O		O	O		O		O
SREB (2002)	O	O	O	O	O	O	O	O	O	O	O	O
McLeod et al. (2003)	O		O		O	O						O
NLN (2005)	O	O	O	O	O	O	O	O	O	O	O	O
Hand (2006)	O	O		O	O	O	O	O				O
Harris et al. (2007)	O	O			O	O	O	O	O		O	O
Bligh and Brice (2009)	O	O	O		O	O		O	O			O
Molenaar et al. (2009)	O	O			O	O	O	O	O	O		
AoME (2010)	O	O	O	O	O	O	O		O		O	O
Bullock et al. (2010)	O	O	O	O	O	O	O	O	O	O	O	O
AoME (2011)	O	O	O	O	O	O	O	O	O	O		O
HEA (2011)	O	O	O	O	O		O			O		O
Srinivasan et al. (2011)	O	O	O	O	O	O	O	O	O			O
London Deanery (2012)	O	O	O	O	O	O	O		O		O	O
COPDEND (2013)	O	O	O	O	O	O	O	O	O	O	O	O

O = Competences relating to the area are found in the literature

Chapter 4 Areas of Competences for Dental Educators

The reviews in Chapter 3 revealed competences of dental educators in 12 domains. This chapter aims to provide discussion and analysis of each domain in detail but only relating to the context of this research study (UG-DentalEduc and dental educators). The implication for dental educators is provided at the end of each topic. The competences identified were also used as a framework to develop a questionnaire employed for collecting data in this research project (see Chapter 6).

4.1 Educational Theories and Principles

Recently, Srinivasan et al. (2011) outlined four core educational principles of medical education. They argue that educators need to (1) intellectually connect and engage with students, (2) put students as the first consideration for teaching and learning, (3) be able to adapt educational context to respond to students' needs and (4) critically analyse and improve their own educational performance. These core values reflect the roles of educators within an UG-curriculum; however, they place less emphasis on students and other components of the UG education. If the UG-DentalEduc comprises a number of components and is influenced by many factors (see Chapter 2), the core values need to reflect every aspect of the UG-DentalEduc.

In dental education, Falk-Nilsson et al. (2002) proposed four core principles. Students need to: possess professional behaviours and characteristics; receive sound dental knowledge and learning; develop research skills for applying evidence to support patient care; and be aware of the patient-centred approach. These values probably reflect the goal of dental education in helping students achieve professional competences to be safe

practitioners. However, they still only focus on one aspect of the UG-DentalEduc – students.

These examples indicate general values for effective education; however, they would not be fully achieved if there were a lack of understanding and appropriate implementation of theories and principles underpinning these values. Dental educators have to possess understanding of a wide range of educational theories and principles that enable them to support development and implementation of effective, evidence-based UG-DentalEduc. Various educational principles have been suggested by the literature and standards (Hesketh et al. 2001; Manogue et al. 2011; COPDEND 2013a). However, the sub-topics discussed here are: learning theories, learning styles and approaches, student-centred approach, evidence-based teaching, reflection, experiential learning, self-directed learning, and the learning environment.

4.1.1 Learning Theories

Many theories explaining human learning have been developed over the decades. The common theories which underpin recent health professional (including dental) education are behaviourism, cognitivism, radical constructivism, social constructivism (social learning), and humanism (Ertmer and Newby 1993; Karagiorgi and Symeou 2005; Jordan et al. 2008; Kaufman and Mann 2010; Dornan et al. 2011). The key principles of these theories are represented in Table 4.1.

Table 4.1 Summary of the key learning theories.

Learning Theory	Behaviourism	Cognitivism	Radical Constructivism	Social Constructivism	Humanism
Learning Process	Change in behaviour	Internal mental process	Construction of meaning/learning from experience	Observation of and interaction with others in a social context	A personal act to fulfil personal potential
The aim of Education	Produce behavioural change and desired behaviour	Develop mental capacity and skills	Construct knowledge	Model new roles and behaviour	To become autonomous and self-actualised
Teacher's Roles	Arrange and control environment	▪ Structure content and activity ▪ Provide scaffolding	Facilitate and support learning	▪ Guide learning ▪ Be good role model	Facilitate personal development
Educational Methods	▪ Use of behavioural objective ▪ Competency-based education ▪ Skills development	▪ Cognitive development ▪ Learning how to learn ▪ Use of memory to support learning	▪ Reflective practice ▪ Experiential learning ▪ Self-directed learning	▪ Socialisation ▪ Supervision ▪ Mentoring	▪ Self-directed learning ▪ Andragogy

Adapted from Ertmer and Newby (1993), Jordan et al. (2008) and Dornan et al. (2011)

In some contexts, several strategies from different theories could be implemented together in order to maximise student learning. For example, a lecture based on behaviourist or cognitivist theories is effective in providing abstract or foundation knowledge; then students can use this knowledge for discussion and developing learning in a subsequent constructivist small group learning. This strategy is defined as 'moderate constructivist' and is used to ensure that students can benefit from different educational strategies (Karagiorgi and Symeou 2005).

4.1.1.1 Implications for Dental Educators

An UG-curriculum has to employ a variety of educational strategies (e.g. lecture, laboratory, clinical practice) to help students develop professional competences. While recent literature seems to encourage the use of learning

theories relating to a student-centred approach such as constructivism (Harris et al. 2007; Edmunds and Brown 2010; Frank et al. 2010b), other traditional learning theories (e.g. behaviourism) are still beneficial in dentistry. In order to prevent deterioration of knowledge and skills (see Chapter 2), repeated practise for maintaining knowledge and clinical skills after being 'competent' is required. This notion is relevant to the behaviourist theory in which iteration of exercise/practice enables the learner to develop learning (e.g. maintain knowledge and skills in this context) (Ertmer and Newby 2013). This example reflects that learning theories can be applied to different educational strategies at different stages of the UG-curriculum.

4.1.2 Reflection, Experiential Learning, and Self-Directed Learning

4.1.2.1 Reflection

Reflection is a process by which students consider their experience or learning, evaluate the context and feeling, then develop an understanding of the situation that enhances their further action or practice (Schön 1987). Two types of reflection have been identified: reflection-in-action, which occurs immediately in the learning situation; and reflection-on-action which happens after the event (Kaufman and Mann 2010). Although there is no direct evidence that reflection can improve patient care, it is generally accepted that reflection can improve student learning and performance (Sandars 2009). Students can benefit from reflection in several aspects (Mann et al. 2009; Kaufman and Mann 2010). For example, the iterative process of considering the experience and context enable students to gain insight of a learning issue. Reflection helps students dealing with a complex problem in the healthcare setting. It also promotes development of professional competence and identity. This happens when students reflect on their performance in a clinical context.

It is claimed that there is no association between a student's reflective skills and practice outcomes (Mann et al. 2009). This possibly implies that reflection may not directly relate to practical skills and performance; instead, it is a basis of other learning processes including experiential learning and self-directed learning which then result in learning achievement or practice outcome (Kaufman and Mann 2010).

4.1.2.2 Experiential Learning

It is commented in the literature that experiential learning is essential for student learning and something that educators need to understand (Wall and McAleer 2000; Yardley et al. 2012). The experiential learning cycle comprise four stages (Kaufman and Mann 2010) (Figure 4.1): (1) students gain experience in clinical practice or from laboratory practical exercise (concrete experience); (2) they reflect on experience (reflective observation); (3) they develop learning and knowledge from the reflective process (abstract conceptualisation); and (4) they apply knowledge in a new context and gain new experience (active experimentation).

There are two issues which need consideration regarding experiential learning. Firstly, reflection is a key factor that helps students to make sense of their previous performance and practice outcomes and allows them to develop linkages between prior knowledge and new experience; this process leads to a development of new understanding/knowledge (Kaufman and Mann 2010). In this process, students take responsibility for their learning by assessing their present knowledge, exploring areas of improvement, and developing new learning. This concept relates to self-directed learning which Dornan et al. (2011) asserts is fundamental for lifelong learning.

Secondly, according to empirical studies, the majority of UG students in several countries possess the accommodating learning style in which

learning is developed by doing and feeling (i.e. practising and gaining experience) (Holtbrügge and Mohr 2010); and learning styles which stem from the principles of experiential learning also relate to cultural background (Barmeyer 2004). This indicates that experiential learning is fundamental for understanding student learning styles and developing effective teaching to support students from different backgrounds and in different contexts.

4.1.2.3 Self-Directed Learning (SDL)

New knowledge has been discovered continuously and become available rapidly, it is impossible for students to learn all new knowledge within a curriculum period. Moreover, face-to-face contact hours between educators and students are limited by curriculum time and student workload (Oliver et al. 2008). Students need to learn 'how to learn' and educators are the key people to support students in developing this essential skill (Haden et al. 2006). One strategy that helps students to develop independent learning skills is SDL. SDL is an on-going process in which students take responsibility to identify learning needs, explore strategies to meet those needs, engage in the learning process, and evaluate their learning progress and achievement (Dornan et al. 2011). SDL plays an important part in enabling students to acquire knowledge and develop learning during their study while reflection is a tool for helping students to evaluate their recent knowledge and identify learning needs that are crucial for SDL. These processes require educators to create a positive learning environment and support students via mentoring and supervision (Mann et al. 2009). Ultimately, in conjunction with higher-ordered thinking skills, reflection, experiential learning, and SDL are key competences which support the development of lifelong learning, which is fundamental part of being a professional (Dornan et al. 2011).

4.1.2.4 Implications for Dental Educators

While reflection is a skill which students need to learn and be taught by educators, it is undeniable that problems could arise with this when the educators have little experience of reflection themselves. Reflection requires practise in order to master reflective skills. It involves not only what one has done and what procedures were utilised, but also critical appraisal of performance and the identification of areas for further development (Schutz 2007; Wilding 2008). However, some dental educators might not regularly get involved in reflective practice (if they are not full-time academics or their routine dental practice does not require reflection). These educators may not be able to perform reflection for themselves or fully support students to develop reflective skills.

For experiential learning, students may not necessarily start the cycle from concrete experience (first stage). For instance, students may already have learned theoretical aspects from a lecture, so in a phantom-head laboratory they can apply knowledge to perform a specific procedure (fourth stage), then gain practical experience and so on. This suggests that students can begin the learning process from a different stage of experiential learning depending on their preferences or contexts. This might relate to the nature of teaching and learning in dentistry where learning can also develop through a classroom-based session, clinical practice, or observation.

There are two schools of thought about SDL. The first is to plunge students straight into SDL, which is a part of a problem-based learning (PBL) processes. This strategy is employed successfully by a PBL UG curriculum (e.g. the Malmö model) (Rohlin et al. 1998) and SDL has been shown to be an effective method for encouraging student learning. However, in the novice-expert continuum (see Chapter 2), students take responsibility for their learning gradually, developing from novice (dependent to educators) to beginner (gaining more responsibility) and then on to competent

(independent learners). This notion is relevant to the second school of thought that SDL is a progressive philosophy whereby the method of learning moves from didactic through directed self-learning towards self-regulated learning (White and Gruppen 2010; Dornan et al. 2011). However, there is a scarcity of evidence about which strategy of SDL is more effective. Additionally, how much knowledge dental educators need to develop relating to reflection, experiential learning, and SDL has not yet been recommended by the literature.

4.1.3 Learning Styles and Approaches

There are two aspects that determine the way students learn and develop knowledge: learning styles and learning approaches. Learning style is the way that learners develop learning (Cassidy 2004; Kolb 2005). There are a number of models which explain student learning styles. For example, the VARK model categorises learning style into four types: visual, auditory, reading and kinaesthetic (Fleming and Mills 2014). The model has been utilised in several disciplines including dentistry (Murphy et al. 2004). Honey and Mumford's model divides learning styles into activist, reflector, theorist, and pragmatist; they were developed based on Kolb's Experiential Learning model (Hawk and Shah 2007). The theory which is generally used in management and education is Kolb's Learning Style Inventory (LSI) (Holtbrügge and Mohr 2010; ALQahtani and Al-Gahtani 2014; Ozcan 2015). The LSI classified learning styles into four types: accommodation (learning by doing and feeling), divergence (learning by observing and feeling), assimilation, (learning by observing and thinking) and convergence (learning by doing and thinking). Figure 4.1 summarises Kolb's experiential learning and its relationship to LSI, and Honey and Mumford's learning styles models.

Figure 4.1 Kolb's experiential learning and learning styles.
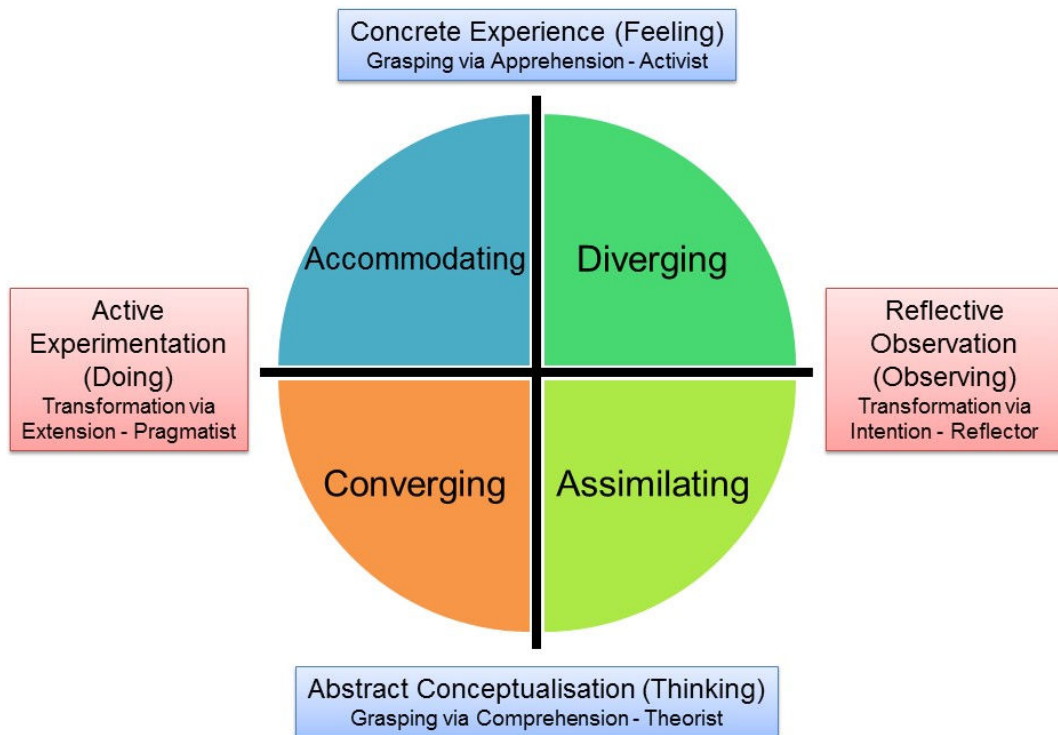
Adapted from Kolb (2005) and Hawk and Shah (2007)

It is believed that learning styles are fixed within individuals (Oliver et al. 2008). Several empirical studies revealed that students from the same cultural heritage tend to have similar learning styles (Barmeyer 2004; Holtbrügge and Mohr 2010). A review of literature from different disciplines by Yamazaki (2005) supports the argument that learning style is related to cultural backgrounds. This implies that learning styles are probably fixed to cultures and do not change in different contexts. In contrast, a study by Wong (2004) showed that international students in a university in Australia could adapt themselves to the learning styles which are used locally. The author claimed that learning styles are contextual-based and adaptable. However, in that study context, the focus was on how international students who are familiar with a teacher-centred approach adapt to a student-centred approach. Arguably, the adaptation of students to new learning environments

is a result of students adjusting their learning approaches instead of learning styles.

Learning approach is a term that is often used interchangeably with the learning style; although each term emphasises a different aspect. Learning approach is the way learners tackle or engage with learning; it primarily highlights cognitive processes and strategies (Cassidy 2004; Case and Marshall 2009). Learning approaches can be classified into three categories – deep, surface, and strategic learning (Newble and Entwistle 1986; Case and Marshall 2009) (Table 4.2).

Table 4.2 Three types of learning approaches.

Surface Learning	Deep Learning	Strategic Learning
▪ Memorise information needed for assessments ▪ Try to learn in order to repeat what they have learned ▪ Take a narrow view and concentrate on detail ▪ Fail to distinguish principles from examples ▪ Tend to stick closely to the course requirements ▪ Is motivated by fear of failure	▪ Actively seek to understand the material/the subject ▪ Interact vigorously with the content ▪ Make use of evidence, inquiry and evaluation ▪ Relate new ideas to previous knowledge ▪ Tend to read and; study beyond the course requirements ▪ Is motivated by interest	▪ Organise time and distribute effort to greatest effect ▪ Ensure that the conditions and materials for studying are appropriate ▪ Use previous exam papers and assessments to predict questions ▪ Use marking criteria carefully ▪ Select what is essential and needed for learning ▪ Intend to obtain high grades

Adapted from Newble and Entwistle (1986) and Case and Marshall (2009)

Learning approach, in contrast to learning style, is not fixed with individuals; instead it is adaptable (Oliver et al. 2008). For example, students tend to use surface learning to cope with a large number of examinations (Case and Marshall 2009), while students utilise strategic learning to select and learn information which is necessary for a specific purpose (including for practice or examination) (Newble and Entwistle 1986). This infers that learning approach is influenced by learning context, especially examinations. Developing a positive learning environment and reducing stress from learning within an UG-curriculum could help students to develop better learning (Divaris et al. 2008); this may encourage students to use a deep learning approach instead of surface or strategic approaches.

The other two issues relating to learning styles and approaches are teaching styles and teaching approaches that focus on the characteristics and behaviours of educators. Table 4.3 and 4.4 summarise the classification of teaching styles and approaches proposed by Grasha (1996) and Trigwell and Prosser (2004) respectively.

According to the tables, both teaching styles and approaches relate to roles and perceptions of educators toward students and their learning. For example, the 'Expert' style and approach 'A' indicate the educator as information provider in a teacher-centred context, while the 'Delegator' style and approach 'E' emphasise the educator as learning facilitator in a student-centred context. This possibly implies that teaching styles and approaches are not fixed with individuals; they represent the roles of educators in different learning contexts.

Table 4.3 Teaching styles.

Style	Description
Expert	Possesses knowledge and expertise that students need. Strives to maintain status as an expert among students by displaying detailed knowledge and by challenging students to enhance their competence. Concerned with transmitting information and ensuring that students are well prepared.
Formal Authority	Possesses status among students because of knowledge and role as a faculty member. Concerned with providing positive and negative feedback, establishing learning goals, expectations, and rules of conduct for students. Concerned with the correct, acceptable, and standard ways to do things and with providing students with the structure they need to learn.
Personal Model	Believes in "teaching by personal example" and established a prototype for how to think and behave. Oversees, guides, and directs by showing how to do things, and encouraging students to observe and then to emulate the instructor's approach.
Facilitator	Emphasises the personal nature of teacher-student interactions. Guides and directs students by asking questions, exploring options, suggesting alternatives, and encouraging them to develop criteria to make informed choices. Overall goal is to develop in students the capacity for independent action, initiative, and responsibility. Works with students on projects in a consultative fashion and tries to provide as much support and encouragement as possible.
Delegator	Concerned with developing students' capacity to function in an autonomous fashion. Students work independently on projects or as part of autonomous teams. The teacher is available at the request of students as a resource person.

Adapted from Grasha (1996)

Table 4.4 Teaching approaches.

Approach	Description
A	Teacher-focused strategy with the intention of transmitting information to students.
B	Teacher-focused strategy with the intention that students acquire the concepts of the discipline.
C	A teacher/student interaction strategy with the intention that students acquire the concepts of the discipline.
D	A student-focused strategy aimed at students developing their conceptions.
E	A student-focused strategy aimed at students changing their conceptions.

Adapted from Trigwell and Prosser (2004)

4.1.3.1 Implications for Dental Educators

In dentistry, different learning contexts may require different learning styles. For example, the assimilating style is relevant to a classroom-based learning. In contrast, learning in a clinical context is possibly congruent with the diverging style. However, an empirical study reported that most UG students possess the accommodating learning style (Holtbrügge and Mohr 2010). This suggests that not all students may benefit from every teaching method provided in an UG-curriculum.

Although deep learning is preferable, one might argue that strategic learning is more relevant to a future professional career. The dental professional needs to know how to select and learn new knowledge which is the most relevant to their career and practice. Strategic learning is essential for selecting what to learn and dental professionals can later develop deep learning in a specific area. Whether dental educators need to encourage students to develop deep or strategic learning is still controversial.

4.1.4 The Student-Centred Approach

4.1.4.1 What is a Student-Centred Approach?

Teaching styles and approaches mainly relate to how educators control student learning and how much freedom students have for their own learning. This notion is relevant to the contrasting principles of teacher-centred and student-centred approaches. The teacher-centred approach focuses on a low level of student choice, passive learning, and the authority of teachers while student-centred focuses on a high level of student choice, active learning, and power students have over their own learning (O'Neill and McMahon 2005).

The student-centred approach provides students with active engagement in learning contexts, a high level of flexibility in learning, and a power to take control and responsibility for their own learning (O'Neill and McMahon 2005). It can decrease the surface learning and enhance the deep learning approach (Baeten et al. 2010; Baeten et al. 2013). It is suggested that educators require an understanding of the student-centred approach in order to effectively support student learning and development (Wall and McAleer 2000; Oliver et al. 2008; Srinivasan et al. 2011). Student-centredness is one aspect of CBE which educators need to appreciate in order to provide effective teaching within the UG-curriculum (Chambers 1998; Frank et al. 2010a).

However, it is not necessary that all students are familiar with student-centred learning. A study by Paukert and Richards (2000) suggested that students at an UG level require educators to get involved in and direct their learning. This is probably because UG students lack foundation knowledge, skills, and experience – student are still in the 'novice' and 'beginner' stages (see Chapter 2). Additionally, cultural background also provides an influence on student learning (Hofstede et al. 2010). For instance, students in many Eastern countries are familiar with teacher-centred learning; they respect and believe in their educators, perceiving them as 'information providers'. Students prefer to listen to educators rather than to discuss in a group. In contrast, students from many Western countries are eager to present their opinions to a group and feel comfortable about arguing with their educators (Kember 2000; Phuong-Mai et al. 2005). This suggests that a teacher-centred approach may still be required in Eastern countries, while in Western countries students are able to adapt themselves to a student-centred approach.

4.1.4.2 Mentoring, Coaching, and Supervision

While students develop professional knowledge and skills from novice toward competent level, the role of educator gradually changes from providing information and direction to supporting learning and development (Chambers 1993, 1994; Paukert and Richards 2000). Through reflection, experiential learning, and SDL students control their learning and the development of professional competences. However, these processes also require feedback and support from educators (Mann et al. 2009; Kaufman and Mann 2010). Educators play an essential role in supporting student development, especially within the student-centred approach.

Several terms associated with the role of 'learning support' have been discussed in the literature and sometimes they are used interchangeably and confusingly (D'Abate et al. 2003). For example, mentoring is a process by which an experienced individual provides guidance and support to a novice colleague (Launer 2010). It aims to enhance the growth and development of the novice through several processes including collaboration and role modelling (Murphy et al. 2005) within a long-term period (D'Abate et al. 2003). In contrast, the term 'coaching' is used to describe using an individual's potential to help another individual to achieve specific goals in a short-time period and to enhance their performance (D'Abate et al. 2003; Launer 2010). These two terms are commonly used in clinical practice (Fugill 2005; Kalén et al. 2010).

Another term relating to both clinical and non-clinical contexts is supervision. *"Supervision covers all one-to-one encounters aimed at promoting competence and reflective practice"* (Launer 2010, p. 112). The author claims that supervision also includes mentoring and coaching. However, one might argue that supervision could involve intervention in learning or practice in some contexts. In a dental practice, for instance, if an unexpected situation happens during student practice, a dental educator needs to take control of

the situation by correcting a student's work while the student observes the educator. In this context, supervision can cover an ability to recognise unforeseen circumstances and to recover the learning situation and patient trust.

4.1.4.3 Evidence-Based Teaching

A wide-range of contemporary educational strategies for the student-centred approach have been developed and utilised in health professional education including PBL and case-based learning (Colliver 2000; Garvey et al. 2000; Rich et al. 2005; Hendricson et al. 2006). Traditional educational methods (e.g. lectures) have been shown to be insufficient to help students attain a large amount of new knowledge and develop professional competences (Rossomando and Moura 2008). Also recently, the number of publications in dental education research has been growing (Sukotjo et al. 2010). It is essential for educators to understand evidence about which educational strategies work and are appropriate to an UG-curriculum. Educators need to acquire an ability to critically appraise and apply educational evidence to support teaching and learning (Hesketh et al. 2001; Srinivasan et al. 2011; COPDEND 2013a). However, some educators lack awareness and competence in teaching based on sound evidence (evidence-based teaching) (Masella and Thompson 2004; McLeod et al. 2008). Thus, evidence-based teaching is an area in the further development of dental educators.

4.1.4.4 Implications for Dental Educators

Regarding the Western literature, the student-centred approach provide students more opportunities to develop learning and professional skills than the teacher-centred approach. However, the issues relating to cultural impact on learning have not yet been taken into account. It cannot assume that the student-centred approach is more beneficial to students especially in Eastern countries where the teaching-centred approach is dominant (see Chapter 5).

Hence, an appropriate mixture between teacher-centred and student-centred approaches in the UG-curriculum is desirable. In a context where there is a mixture of students from different background, educators may need to direct student learning at an early stage in an UG-curriculum. This could help students feel comfortable with the teaching and learning strategies. Then, in the later years, educators can gradually introduce student-centred strategies, thereby allowing students to take more responsibility on developing their own learning.

However, several questions which require further investigation arise from the above situation: when and how to use teacher-centred and student-centred approaches to enhance student learning, how much knowledge about these approaches dental educators need to develop, what is the most appropriate role of educators in supporting student learning, and what educational strategies are effective to help students learn?

4.1.5 Learning Environment

Students need a learning environment that motivates them and facilitates their learning. Learning environment refers to *"the material and social context wherein learners 'learn', which influences learner's behaviour, emotions, and practical competences"* (Dornan et al. 2011, p. 341). Dornan et al. (2011) propose two types of learning environments: formal environments which exist within the designed curriculum and relate directly to learning (e.g. university-based format); and informal environments which exist outside the formal curriculum and not directly relate to learning. An example of an informal environment is when students discuss on a learning topic within a group outside a university (e.g. a meeting in a coffee shop). From the student's viewpoint, learning environments mainly include educational processes within a curriculum: teaching, learning, assessment, learning resources, and support (Divaris et al. 2008) while from the educator's viewpoint, it also includes organisational issues such as faculty development or healthcare

team (Haden et al. 2006). Regardless of the scope or type of the learning environment, educators need to recognise how students can benefit from the learning environment and how to create an environment to support student learning effectively.

There has been a call for a dental UG-curriculum which provides a learning environment that supports student-centred learning, reflection and SDL. Strategies for developing a positive learning environment including: early clinical exposure, opportunities for SDL, opportunities to get involved in research projects, extracurricular activities, and safe and friendly environments which respect their diversity and well-being (Oliver et al. 2008; Manogue et al. 2011). Educators require an ability to create effective teaching and learning strategies which allow students to be effective, lifelong learners.

4.1.5.1 Implications for Dental Educators

A positive learning environment (e.g. good classroom format) can enhance students to fully benefit from student-centred learning. However, as discussed previously, educational strategies employed within an UG-curriculum could be influenced by cultural factors and the nature of the discipline (e.g. the nature of UG-DentalEduc). This raises several concerns for dental educators; for instance, what kind of learning environment is effective in a specific context and what kind of learning environment should dental educators provide to students in different contexts?

This sub-topic focuses mainly on physical learning environment. The environment relating to 'educators' and student-educator relationship will be discussed in Topic 4.12.

4.2 Modes of Education

It has been remarked that a curriculum should provide academic freedom which allows educators to exercise various educational strategies and allows students to enhance their learning through a variety of learning styles and approaches (Falk-Nilsson et al. 2002). Educational strategies utilised within a curriculum need to allow students to apply knowledge in a real situation, to develop deep learning and to cultivate their professional competences (Manogue et al. 2011). Several studies (Hesketh et al. 2001; Hand 2006; Harris et al. 2007) assert that effective educational methods need to place students at the centre of learning. The examples of these methods are small group teaching and chairside/bedside teaching. The above studies also recommend that educators need to select and utilise methods that are appropriate within the learning context and congruent with student learning styles and approaches.

In this topic, various educational strategies are discussed, including small group teaching, large group teaching, teaching in a clinical setting, outreach education, and interprofessional education.

4.2.1 Small Group Learning vs Large Group Teaching

Recently, educational approaches have shifted from teacher-led passive learning (where educators plan and control student learning) to more student-centred active learning (where students have more control of learning) (O'Neill and McMahon 2005). It is recognised that active small-group learning is advantageous for student learning and developing of professional competence (Davis and Harden 1999). Benefits of active small-group learning over other passive learning have been reported. For example, in a small-group session, students have the opportunity to actively participate with other group members, which allows them to learn from and collaborate with others to achieve learning goals (i.e. collaborative learning) (Davis and Harden 1999). When working with others, they can develop interpersonal,

management and leadership skills which are essential for their future professional career (Edmunds and Brown 2010). Students are able to take responsibility for their own learning to fulfil their learning gaps; this is the basis of effective reflective and self-directed learning skills (Hendricson et al. 2006). Active learning components of small groups can encourage students to develop deep learning as students are able to utilise a variety of learning styles and approaches which allow them to gain in-depth understanding of a specific issue (Felder and Brent 2005).

However, it has been argued that sometimes small group learning may not be effective due to lack of group activities and interactions (Oliver et al. 2008). The effectiveness of small group learning depends mainly on the active participation of students. Putting students into a group but letting them work individually is not small group learning; small group learning requires interaction, discussion, and collaboration amongst students (Edmunds and Brown 2010). Several studies have reported that in some circumstances, large group teaching may be more beneficial than small group learning and/or other active learning strategies (Harden and Crosby 2000; Manogue et al. 2011). For instance, a lecture can be inspirational and allow students to appreciate the subject while a small group session may fail to encourage or motivate student learning. Educators can provide knowledge and personal experience relating to local contexts which cannot be found in a textbook or other resource, and which give students more understanding of a topic. Finally, large group teaching is a highly cost-effective method for transferring knowledge to a large number of students simultaneously.

In order to improve the effectiveness of large group teaching, a session needs to be interactive and utilise active learning activities (e.g. student discussion) (Divaris et al. 2008). It is also possible to use large group teaching with other active learning methods (e.g. PBL). For example, a lecture can be used to provide discrete knowledge (which has no relation to

student prior knowledge) that enables students to use such knowledge to develop learning in a small group session (Karagiorgi and Symeou 2005). Alternatively, in one PBL curriculum, a lecture is delivered aimed at clearing up the areas that the students have difficulty with during the PBL session (Rohlin et al. 1998). The key issue relies on a learning process that stimulates students to apply skills and knowledge to develop deep understanding and maintain knowledge in their long-term memory (which they can retrieve and transfer into other contexts). If large group teaching could incorporate this, it would provide an effective learning process for individual students as well as small groups. Educators need to enhance this educational strategy by providing interactive participation (e.g. case scenarios) and feedback to stimulate students learning (Graffam 2007).

4.2.1.1 Implications for Dental Educators

Across Europe, UG-DentalEduc has moved toward CBE where student-centred approaches, include active small group learning, are the main focus. In some European countries, PBL is successfully implemented throughout the UG-curriculum with a supplementary use of traditional lectures as an extra-curricular component (Rohlin et al. 1998). However, dental educators need to be aware that while small group learning provides benefits to students, it may not fully replace the traditional lecture. The cultures in some European countries are not fully compatible with small group teaching (see Chapter 5); large group teaching is inevitably still essential in these countries. The balance between small group and large group methods especially in different European contexts is an ongoing debate.

4.2.2 Clinical Teaching in Dentistry

4.2.2.1 Chairside Teaching

In a clinical setting, educators can provide teaching either to each student at their dental unit (i.e. one-to-one teaching) or to a group of students before or after the clinical session (i.e. small group teaching). The former relates to the nature of the dental profession where practice is developed through active involvement and contact with patients, requiring the adherence to professional standards (Sweet et al. 2008). Learning and teaching can happen at a dental chair during the practice. This type of teaching has been reported in the literature as 'chairside teaching' and is an effective teaching method in clinical dentistry (Sweet et al. 2008). The pedagogical benefits of chairside teaching are: it allows students to actively construct knowledge; it promotes deep learning; it helps students to integrate knowledge, skills, and other attributes to solve problems; and it promotes interpersonal skills and professionalism (McMillan 2011; Fugill 2012). Clinical teaching and learning involve a specific form of knowledge and skills; it is important to understand this nature in order to enhance student learning in a clinical context.

4.2.2.2 Types of Learning and Tacit Knowledge in Dentistry

In everyday teaching practice, educators are familiar with a variety of methods employed in UG-DentalEduc such as small group learning and clinical practice. Dentistry involves both explicit and implicit knowledge. Explicit knowledge is knowledge which can be explained verbally or 'codified' which is *"subject to quality control … and given status by incorporation into educational programme, examination, and courses."* (Eraut 2000, p. 114). It is knowledge found in literature, articles, or textbooks. Evidence-based dentistry is an example of codified knowledge (Fugill 2012).

In contrast, implicit knowledge is developed through non-language based (procedural) learning which occurs in the basal ganglia part of the brain; it incorporates different types of memory, sensory systems (e.g. smell, sight), and psychomotor skills (e.g. active decision making to adjust the motor skill depending upon circumstances) (Maddox and Ashby 2004). Individuals develop and use implicit knowledge without conscious awareness of what is learned and when it is learned. In health professional disciplines especially dentistry, implicit knowledge is sometimes called 'tacit knowledge', and both terms have similar meaning. This knowledge is mainly a part of clinical dentistry that involves proprioceptive skills (Horst et al. 2009). In addition to psychomotor skills, tacit knowledge also includes cognitive ability, routines, procedures, and values (Nonaka and Von Krogh 2009).

It is believed that tacit knowledge cannot be conveyed verbally because one might not be aware of it (Polanyi 1997). For instance, students may not know how much force to apply on the hand piece when preparing a class I cavity, although they have already gained knowledge and skills from pre-clinical study. Further, educators may struggle with explaining this issue to students because it is subjective and relies on personal experience and proprioceptive skills. The 'force' in this situation is a tacit component that students cannot learn without direct experience and educators cannot describe verbally. However, it is argued by Nonaka and Von Krogh (2009) that tacit knowledge can be shifted to explicit knowledge through processes such as sharing and discussion. In the example above, hence, students could understand something about the issue of 'force' through educators sharing experience and discussing with students.

Tacit knowledge has a key role in dentistry as students are exposed to this knowledge throughout an UG-curriculum and the rest of their dental career (Chambers 1997; Fugill 2005; Fugill 2012). Regarding the novice-expert continuum (Chapter 2), Eraut (2000) asserts that tacit knowledge occurs in

every stage of the continuum. Concerning dental routine procedures, knowledge starts as explicit then becomes tacit knowledge through repetitive practice. At the competence stage, individuals begin to gain 'unconscious competence' – when practitioners gain more experience and expertise over time, they can perform a specific procedure naturally (Hendricson and Kleffner 1998). In short, it is essential for educators to help students being aware of tacit knowledge (Kinchin et al. 2008). Student reflection and feedback from educators are essential for articulating tacit knowledge and helping students learn (Fugill 2012).

4.2.2.3 Implications for Dental Educators

Since tacit knowledge can be found throughout an UG-curriculum, educators require effective communication skills to help students be aware of tacit knowledge. The literature also shows that communication is an essential skill for being effective educators (Paukert and Richards 2000; Jahangiri et al. 2013). However, educators do not routinely provide effective communication with students and leave tacit knowledge unexplained like *"I don't know why, that's just the way it is."* (Fugill 2012, p. 2). This probably reflects that many educators have not yet fully been aware of tacit knowledge in clinical dentistry.

4.2.3 Outreach Education

Strauss et al. (2010) commented that although students can learn social and behavioural sciences from several courses in a curriculum, they should have opportunities to apply this knowledge in a real context (i.e. the community). An aim of the outreach/community-based education is to help students gain 'real world' professional experiences (Elkind 2002). The benefits of outreach education have been revealed in the literature (Maley et al. 2009; Smith et al. 2010; Formicola and Bailit 2012). It allows students to develop cultural awareness, professional attributes, and public engagement; and students have opportunities to practice and develop clinical skills in a real healthcare

context. Several skills which students need to develop as a part of professional competences, (e.g. interpersonal and management skills) are rarely taught through the formal learning in a curriculum (Gonzalez et al. 2013). Outreach education is an additional strategy for students to gain these essential skills (Strauss et al. 2010).

However, the educational quality and effective administration are issues for consideration in outreach education. Despite the report on successful outreach programmes (Waterhouse et al. 2008; Smith et al. 2010), outreach education requires much in the way of resources, infrastructure, support, collaboration from various stake holders, and positive learning environment and culture (Morris and Blaney 2010; Eriksen et al. 2011). An important issue is that local educators need to be trained especially in the area of teaching and learning in order to maintain the quality of outreach education (Smith et al. 2006). From the practical aspect, the cost-effectiveness of outreach education may be still controversial.

4.2.3.1 Implications for Dental Educators

Outreach education is an effective method that supports student learning and professional development. While the staff-per-student ratio in a dental teaching hospital is often inappropriate (i.e. insufficient staff) (Martin et al. 2010), outreach education could provide more favourable staff-per-student ratio allowing closer supervisory support. However, the cost-effectiveness and quality control of outreach education is still questionable (Eriksen et al. 2011). Recent literature may not yet fully help dental educators and dental schools to decide whether to develop and implement outreach education into the UG-curriculum or not.

4.2.4 Interprofessional Education

It is recognised that holistic patient care is important for improving the patient's well-being (Winning et al. 2008). This trend has changed the perception from dentistry practised as by a single professional to dentistry as a part of the allied healthcare workforce; dental professionals need to work with other health professionals in order to provide better healthcare to the society. Interprofessional education which enables students to develop integrated learning by working as a part of healthcare team (Harden 1998) can be an effective strategy to support holistic patient care.

Interprofessional education allows students to develop learning through interactions with other professionals in an authentic environment; it helps students to understand and reflect on the roles and responsibilities of their professional toward patient care; and it can improve practice outcome and healthcare quality (Hammick et al. 2009; Hean et al. 2012). Also, interprofessional education supports the development of essential skills including an ability to evaluate personal and team performance, effectively communicate with the team members, and share knowledge and responsibility with the team (Prideaux et al. 2000).

However, a systematic review by Hammick et al. (2007) showed that despite interprofessional education being of a good strategy for developing knowledge and collaborating skills, it does not improve positive attitude toward other disciplines in the healthcare team (i.e. it fails to engender respect for the knowledge and skills of other team members). This is probably because the nature of individual professionals can create cultural barriers (e.g. hierarchy, jargons) that compromise communication and acceptance amongst professionals (Hall 2005). Additionally, similar to outreach education, staff development is crucial to maintain the quality of interprofessional education (Hammick et al. 2007) and a large amount of resource, infrastructure, and support from staff are also required (Freeth

2010). The above issues raise concerns on cost-effectiveness and quality of interprofessional education.

4.2.4.1 Implications for Dental Educators

It is suggested that educators need to know the basic principles of interprofessional education and be able to use various educational tools to support this method (AoME 2011; COPDEND 2013a). However, problems with practicality and barriers caused by different professional cultures could compromise the quality and effectiveness of interprofessional education. Additionally, it would be possible to replace interprofessional education with outreach education because it can also provide opportunities for students to learn and develop professional competences with other healthcare professions in a local community (Elkind 2002; Formicola and Bailit 2012). This could lead to a controversial issue on whether the interprofessional education is effective and beneficial to UG-DentalEduc.

4.3 Learner's Issues

Students are an important part of the educational process; they can be both the consumers (who study within an UG-curriculum) and the result (graduates) of the education. This means issues which relate to students within a curriculum could influence the process and quality of education. Issues discussed in the literature include student difficulties, support for students, and diversity. This section will primarily emphasise these issues.

4.3.1 Student Difficulties and Support

In medical and dental education, students are usually exposed to pressure and stress from various sources (e.g. learning, patients, educators) (Davis and Harden 1999; Dent and Harden 2013). Manogue et al. (2011) also point out that UG-DentalEduc demands high contact hours, SDL, and a long

academic year. These issues can place both physiological and psychological stress on students, which can lead to learning difficulties. Americano and Bhugra (2010) explain three factors which result in doctor underperformance: biological (e.g. chronic stress); psychological (e.g. stress, personality); and social (e.g. cultural, economic). Dent and Harden (2013) categorised problems which medical students often experience into five groups: academic, career, professional, personal, and administrative. In dentistry, Hendricson and Kleffner (2002) describe six major causes relating learning difficulties: cognitive factors, ineffective study habits, inadequate educational experience, high level of distractions, and underlying medical conditions (e.g. physical disabilities).

Generally speaking, support is perceived only in terms of 'academic support'. In student-centred learning, students need academic guidance and feedback to acquire knowledge and identify areas of improvement (O'Neill and McMahon 2005). In clinical teaching, students require support and feedback to reflect their performance and develop professional behaviours (Ramani and Leinster 2008). UG students who lack knowledge and skills need guidance and direction from educators in order to improve their learning skills and build up their professional competence (Paukert and Richards 2000); such support needs to be provided throughout the UG-curriculum (Manogue et al. 2011). Support for students also covers other aspects of student life (e.g. personal problems, career guidance) (Dent and Harden 2013). Career guidance, for instance, can motivate student learning by helping students gain insight about future professional practices (Scott 2003; Rupp et al. 2006; Gallagher et al. 2007).

4.3.2 Diversity

One important EU policy for developing a single market and improving competitiveness at the global level is the free movement of European students, academic staff, and professionals. The policy led to the creation of

harmonisation of dental education across Europe (Oliver and Sanz 2007). A dental curriculum needs to provide the basis of student diversity, including opportunities to learn and adapt into a new healthcare setting, observe and learn from different approaches, and experience different contexts and cultures (Manogue et al. 2011). The Erasmus scheme is a strategy that support student diversity and movement of academics across Europe (EUROPA). In order to address differences and diversity, cultural competence has become a key issue that both students and educators need to develop. More discussion on culture and its influences on dental education will be provided in Chapter 5.

4.3.3 Implications for Dental Educators

Educators require knowledge of their learners (e.g. background, level of prior knowledge) to enable them to identify and address student problems effectively (Irby 1994). They need to understand student problems and difficulties in order to employ effective strategies to help/support students. Educators should be able to provide support for students to be able to cope with and reduce their learning difficulties (Divaris et al. 2008). Student support needs to cover these aspects and focus not only on working towards solving the students' problems, but also prevent problems occurring and developing students' management and coping strategies (Dent and Harden 2013). The literature and professional standards also recommend that educators need to be able to provide support and guidance through various strategies to help students develop learning and competences and also overcome learning difficulties (Hesketh et al. 2001; AoME 2011; Srinivasan et al. 2011; COPDEND 2013a).

Within Europe, there is a policy that all students need to receive equal opportunities to gain advantages from higher education for their personal and professional development (EHEA 2007). Although it is unlikely to have students with physical difficulties/disabilities admit to the UG programme

where such disabilities can compromise learning or skill development, it is possible for dental students to be admitted with other types of learning difficulties/disabilities (e.g. dyslexia). For dyslexic students, for instance, they might not have problems at the admission and selection stage, but the symptoms may gradually be revealed during their study in the curriculum. Educators have to recognise when students begin to reveal their problem and be able to refer students to receive appropriate support from a specialist or special department.

However, one might argue that in many universities there are already departments and specialists who are responsible for the issue of students support (e.g. a student support unit). This raises a question whether the development of competences relating to student difficulties and support is essential for dental educator. Additionally, if educators are exposed to a single cultural background (e.g. in a small dental school), the issue of diversity may not be of relevant to the educators. The above notions point out that student difficulties, support, and diversity are still a controversial debate in dental education.

4.4 Educational Materials and Instructional Design

The literature raises that the issue of educational materials and media, and how to design teaching/learning strategies by using new technology are as important as the understanding of educational theories (Falk-Nilsson et al. 2002; Mattheos et al. 2008). This topic focuses on how well the educational materials and technology-enhanced learning (TEL) can support students developing effective learning and professional competences.

4.4.1 Educational Resources and Materials

The student-centred approach needs appropriate learning resources and materials to enable students to access information, acquire knowledge, and

develop competence regardless of time and location (Divaris et al. 2008; Manogue et al. 2011). For example, in small-group learning, students particularly require knowledge from difference resources (e.g. textbooks, journal articles) to support group activities, group learning goal and reflection (Crosby 1996). Educators have to develop and create resource materials which encourage students to take responsibility for their learning. Understanding and skills for selecting, adapting, developing, and producing high quality learning materials and resources are essential (Harden and Crosby 2000).

However, recent developments in TEL have changed the way that educators provide and students use educational resources (Ruiz et al. 2006; Mattheos et al. 2008; Khatoon et al. 2013). Students can access and use educational resources at any time and any place; while the role of educators gradually shifts from directly providing guidance and resources in a face-to-face session to developing resources on a technology platform. Educators have to be aware of how technology influences how resources and materials are developed, distributed, and used by students.

Recently, the use of TEL to support teaching and learning has expanded. The term 'TEL' covers a broad range of methods/tools including: simulation and virtual learning environments (Phillips and Berge 2009; Motola et al. 2013); e-learning using a web-based platform, web blogging, wikis, mailing lists (Feeney et al. 2008); learning through social media (McAndrew and Johnston 2012); and learning with mobile devices (Hardyman et al. 2013). The aim of this research is not to provide in-depth discussion on these tools; rather it is to discuss educational and practical issues of TEL.

TEL provides a number of benefits to teaching, learning, and assessment. TEL can increase learning flexibility which allows students to have

opportunities to learn regardless of learning contexts (Divaris et al. 2008). It promotes use of evidence-based dentistry and research skills by allowing students to access evidence and apply it to their practice (Schleyer et al. 2012); it supports the development of reflective skills, self-assessment, self-directed learning, and lifelong learning abilities (Falk-Nilsson et al. 2002). It has been found that the use of TEL as a part of distance education provides advantages over classroom-based education (Bernard et al. 2004; Johnson et al. 2004). However, these studies only focused on comparing distance learning with traditional strategies, and they did not clearly define the type of technology tools used.

While TEL provides advantages to student learning, it cannot completely replace traditional methods (i.e. classroom-based or clinical-based education) (Falk-Nilsson et al. 2002). Traditional methods can encourage development of positive relationships between students and educators and enable educators to be good role models and resource providers for student (Paukert and Richards 2000; Elzubeir and Rizk 2001; Edmunds and Brown 2012). Additionally, there are several practical limitations in utilising TEL including a lack of support and infrastructure, high cost, and a lack of involvement from stakeholders, and time consuming (Mattheos et al. 2008). Several studies found that the combination between TEL and traditional approaches (blended learning) provides great benefits on student learning as both methods can complement each other (Pahinis et al. 2007; Bains et al. 2011).

4.4.2 Implications for Dental Educators

Recently, the advances in technology have changed how an UG-curriculum is organised (e.g. teaching and learning). The educational benefits of TEL are invaluable; however, TEL also has practical limitations that compromise its effectiveness and benefits. TEL cannot completely replace traditional teaching and learning, especially in dentistry. For example, while immediate

feedback and support from educators are essential for learning in a clinical setting (Fugill 2012), TEL may not fully provide information tailored specifically for student learning needs. In this situation, a face-to-face contact probably provides better opportunities for educators to share experience and expertise with students. The issue for dental educators is they need to know when TEL is appropriate for support student learning. At a broader level, although the literature suggests that the role of educators have to shift gradually from 'information provider' to 'learning facilitator' and 'resources provider', a lack of studies focuses on how to develop and provide a variety of educational resources and materials to support students at different stages (e.g. novice, beginner). The issue of educational resources and materials still need further exploration.

4.5 Assessment and Feedback

4.5.1 Principles of Assessment and Feedback

In the literature, the definition of assessment covers a wide range of aspects including judging learning progress, giving information for further development, identifying level of competence, and ensuring quality of an UG-curriculum (Shumway and Harden 2003; Albino et al. 2008; Schuwirth and Van der Vleuten 2010). One definition which focuses on student learning is that assessment is

> *"the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know and can do as the result of their educational experience; the process culminates when assessment results are used to improve subsequent learning."* (Jordan et al. 2008, p. 339).

From this definition, there are two key messages which are at the heart of assessment: (1) to measure student understanding of a particular issue or

their ability to do something – summative assessment; and (2) to improve student learning – formative assessment.

The goal of summative assessment is to ensure that students have sufficient knowledge and ability to perform independent and safe practice in a real environment (i.e. being competent dentists) (Oliver et al. 2008; Moore and Durham 2011). It is the core issue in judging dental student performance. However, the more important issue is how to support students to achieve the learning outcomes which will enable them to become competent dental practitioners. Formative assessment plays a crucial role on this. Formative assessment is a process of helping students to develop/improve their performance by giving them constructive feedback (Dornan et al. 2011). It has been stipulated by several studies (Harden and Crosby 2000; Hesketh et al. 2001; Harris et al. 2007) that feedback is essential for student learning as it provides information on the quality of their performance and their strengths and weaknesses. Also feedback is a key component of effective reflection and self-assessment (Sandars 2009).

Feedback can motivate students in identifying their learning needs, exploring learning resources, and planning learning strategies for further development. In other words, it is an important part of reflection and student-centred learning. Students need to receive feedback regularly on their learning throughout their study within a curriculum (Manogue et al. 2011). Effective feedback needs to emphasise four aspects (task, process of the task, performance, and personal attribute) which promote student understanding of the situation, their performance and behaviours (Dornan et al. 2011); also educators need to be honest when assessing student performance (Bush et al. 2013).

4.5.2 Assessment Methods

Competence is complex and is not assessed directly; thus, performance is normally considered and assessed as it is a sample of ability that represents competence (Chambers and Glassman 1997). For this reason, performance assessment is recognised as a good tool for assessing professional competences (Landon et al. 2003). However, arguably, competence is a combination of knowledge, performance, and professional attributes; only performance may not fully represent the competence. Assessment methods which focus on performance as well as other aspects of competences and practice readiness would be more appropriate to assess professional competences.

A large number of competence assessment methods – such as written and oral examination, objective structured clinical examination (OSCE), structured clinical operative test (SCOT), and simulation – have been developed and widely utilised (Mossey and Newton 2001; Manogue et al. 2002; Shumway and Harden 2003; Norcini and McKinley 2007). Albino et al. (2008) suggest that the triangulation model of assessment should be utilised for assessing competences in dentistry. In this model, competences are assessed in three parts: performance, self-appraisal and reflection, and knowledge. The performance part is assessed during the internship period by OSCE; this tool provides information of a broad spectrum of competences. In the second part, a portfolio is mainly required to assess self-awareness and appraisal (i.e. self-assessment), and reflection. Although there is no rigorous evidence to support the positive influence of self-assessment on student learning and practice outcomes (Colthart et al. 2008; Mann et al. 2009), it could be argued that if students need to effectively reflect on their learning and performance then self-assessment (in addition to feedback from educators) can help them identify their level of performance and areas of improvement. For the knowledge part, a triple jump exercise that allows students to appraise information and apply knowledge into clinical contexts (Kramer et al. 2009; Navazesh et al. 2013) is recommended.

4.5.3 Quality of Assessment

Utilising a range of contemporary assessment methods may not necessarily guarantee that students are competent after they achieve the assessment criteria. There are several suggestions which educators need to consider in order to provide a high quality assessment (Hobson et al. 2008; Oliver et al. 2008; Manogue et al. 2011). Students should receive constructive feedback on their performance that will allow them to critically analyse and reflect upon their learning experiences and develop professional attributes; hence, providing formative assessment should be considered as an important part of educators' roles. Additionally, learning outcomes, teaching and learning strategies, and assessment methods should be aligned – constructive alignment (Biggs 1996a). This process allows students to know what they are expected to be competent at, what they will learn, and how they will be assessed. This can lead to the development of meaningful learning and deep understanding of the knowledge. Finally, multiple assessment methods are required for assessing different aspects of the competences (Chambers and Glassman 1997).

When assessing students, the level of learning and outcomes needs consideration. Bloom's taxonomy provides different levels of learning in three domains (cognitive, psychomotor, and affective) which indicate progression and development of knowledge, skills, and professional attitudes (Albino et al. 2008). Miller's pyramid can be used to indicate achievement at different levels of learning outcomes (knows, knows how, shows how, and does) (Moore and Durham 2011; Pangaro and ten Cate 2013). The aim of this review is to point out that educators need to be aware of these issues; further details of Bloom's taxonomy and Miller's pyramid can be acquired from educational textbooks and literature.

4.5.4 The Psychometric and Practical Aspects of Assessment

A plethora of assessment tools have been developed to support the use of the student-centred approach; however, the more important issue is that educators need to be able to select the right tools to assess the right things. Assessment and its quality need to be underpinned by sound knowledge or theories such as psychometric theories – the theories of measurement (Shea and Fortna 2002; Schuwirth and Van der Vleuten 2011). Van der Vleuten (1996) proposed the 'utility equation' – which combines both psychometric and practical aspects of assessment – as a guidance for selecting appropriate assessment tools congruent with the educational goal and the aim of the assessment. The equation comprises five factors: reliability, validity, feasibility, acceptability, and educational impact (Table 4.5).

Table 4.5 The assessment utility equation.

Assessment Utility = R x V x F x A x E	
R (Reliability)	An assessment tool needs to provide the same result when it is used in different contexts.
V (Validity)	An assessment tool needs to measure the actual thing as it claimed/aimed to measure.
F (Feasibility)	An assessment tool needs to have reasonable cost-effectiveness.
A (Acceptability)	An assessment tool needs to be easy to use in a real situation and is accepted by key users and stakeholders.
E (Educational Impact)	An assessment tool needs to provide positive result on student learning and development and the outcomes of the educational process.

Adapted from Van der Vleuten (1996)

4.5.5 Implications for Dental Educators

It is recommended that within UG dental curricula across Europe assessment methods and also educational strategies need to be aligned with learning outcomes and educational goals (Oliver et al. 2008; Manogue et al. 2011). Assessment needs to ensure that students achieve learning outcomes and are able to support deep learning and the development of professional competences.

In clinical teaching, there are several educators who supervise groups of students. It is essential for educators to mutually understand the assessment criteria and standards in order to provide a fair assessment for every student in the session. It has been reported that students are aware of assessment quality and standards as well as biases from different educators (Gerzina et al. 2005; Schönwetter et al. 2006). Hence, assessment calibration is an important issue for educators especially those who provide clinical teaching. An ability to provide constructive feedback is another issue that dental educators need to develop. Also since the nature of teaching and learning in dentistry involves tacit knowledge, how to help student to be aware of tacit knowledge and develop deep learning need more consideration. However, assessment calibration and how to deal with tacit knowledge in dentistry are still overlooked by previous literature.

4.6 Curriculum

4.6.1 Undergraduate Dental Curricula across Europe

Regarding the need for comparable qualifications amongst European countries, ADEE is building upon basic curriculum structures for convergence of UG dental curricula across Europe. Recently, ADEE has proposed an UG-curriculum framework which can be used as a guideline for effective

curriculum development (Manogue et al. 2011). The main recommendations are:

(1) A curriculum should be organised in a modular form (learning unit) in order to support mobility and student exchange;

(2) There should be both vertical and horizontal integration throughout the curriculum;

(3) Evidence-based dentistry (EBP), research, and early clinical exposure should be explicitly placed in the curriculum to support SDL, lifelong learning, and professional development;

(4) Teaching and learning strategies, assessment methods, learning materials should be relevant to learning outcomes and educational goals.

Additionally, an UG-curriculum should reflect the nature of dental careers and support oral healthcare need; consequently, all components of a curriculum (e.g. educational philosophy and goal, teaching, learning, assessment, academic support and environments) need to be developed comprehensively (Oliver et al. 2008). The implementation of new curricula needs dental educators who are able to support curriculum change.

4.6.2 Types of the Curriculum

'Curriculum' has been variously defined. A curriculum is: a planned educational experience (Kern et al. 2009); what needs to be included in an educational programme (Dent and Harden 2013); and a statement which comprises components of an educational programme (Grant 2010). Regardless of the definition, to understand why the curriculum is important for students and how the curriculum influences student learning, educators need to appreciate the different curriculum components and types of curriculum.

The curriculum provides all the information of an educational programme that students must undertake and to which educators contribute as a part of their academic role. The curriculum can be classified into three categories (Dent and Harden 2013). Educators are normally familiar with and get involved in the 'declared' curriculum (which is written down in the document) and the 'taught' curriculum (which is delivered to students). However, they need to be aware that students can develop learning by engaging in activity outside the declared and taught curricula. This kind of learning occurs in the 'hidden' curriculum. The hidden curriculum also reveals tacit knowledge/rules (which are often unspoken) about, for example: what behaviour and attitudes are valued, what's accepted as 'normal', and what's expected (Nonaka and Von Krogh 2009). The implication of the 'hidden' curriculum is that what is taught within the curriculum via a variety of educational strategies may be just a part of what students learn. The hidden curriculum allows students to learn, reflect upon, and improve essential skills (e.g. teamwork, communication) that are necessary for developing professional competences (Lempp and Seale 2004; Masella 2006).

4.6.3 Curriculum: Horizontal and Vertical Integrations

Another essential issue is how the curriculum is organised. Curricula for the healthcare professions have tended to utilise the spiral curriculum model, which is a combination of horizontal and vertical integration (Oliver et al. 2008; Grant 2010). The core principle is when students progress through the curriculum, they should be able to apply knowledge across the disciplines (horizontal integration) and revisit the same learning experience at an increasing level of complexity (vertical integration). In this context, students require an ability to transfer knowledge into different contexts and the ability to utilise prior knowledge to learn new information.

With the spiral model, an UG-curriculum can be delivered through traditional methods (lecture/laboratory/clinical practice) or mixed between traditional

and PBL (Greenwood et al. 1999; Rich et al. 2005) or PBL only (Rohlin et al. 1998). However, the advantages and disadvantages of PBL in the curriculum are controversial and subject to ongoing debate (Jones 2006; Bassir et al. 2014). A combination of educational methods and supportive learning environments is fundamental for encouraging students to apply higher-ordered thinking skills and perform effective reflection in order to develop competence (Hendricson et al. 2006).

4.6.4 Implications for Dental Educators

Several studies suggest that educators need to possess knowledge and ability relating to curriculum (McLeod et al. 2003; Harris et al. 2007; Bullock et al. 2010). Harden and Crosby (2000) assert that educators need to contribute to curriculum development and implementation. However, a study by Hand (2006) revealed an opposite notion that understanding of the curriculum is not important for educators. As the scope of the curriculum covers a wide range of aspects from small educational processes to organisational aspects (e.g. curriculum planning); most educators, especially clinical educators, usually contribute only at the micro-level (e.g. clinical teaching). On one hand, educators need to only have an understanding of the curriculum at the level to which they contribute. On the other hand, it can be argued that although most educators do not contribute to the curriculum at an organisational level, they still need to understand the big picture of the curriculum in order to support constructive alignment (see Section 4.5.3). The extent to which it is important for dental educators to understand the whole curriculum remains unclear.

4.7 Evaluation

4.7.1 Definition and Purpose of Evaluation

Evaluation is generally accepted as an integral part of the educational system, curriculum, and quality improvement (Goldie 2006). Evaluation is the process of obtaining, analysing and interpreting information in order to assess status, strengths, weaknesses, and merit of an educational programme (Dornan et al. 2011; Yarbrough et al. 2011). Evaluation is used for several purposes: curriculum evaluation, accreditation, feedback on course/teaching, improving educational content and methods, supporting faculty development and promotion, and demonstrating accountability of the educational programme to the public (Harden and Crosby 2000; Kogan and Shea 2007). It can be summarised that evaluation is a process of understanding the quality of an educational programme and educational process (e.g. teaching/learning/assessment) within the programme.

The focus of evaluation can be classified differently; for instance, evaluation can focus on an educational programme, its components, and stakeholders (Goldie 2006), or focus on the determination of the quality: utility, feasibility, propriety, accuracy, and accountability of a programme (Yarbrough et al. 2011). However, the focus of evaluation needs to fit with the purpose of evaluation (Wall 2010). Similarly to assessment, evaluation can be either formative (for improvement) or summative (for making judgment) (Firmstone et al. 2010). The common purposes of evaluation are to appraise the quality of teaching or the quality of an educational programme/curriculum; and to provide recording of a change of practice to benefit the public (Goldie 2006).

4.7.2 Evaluation of Teaching

The aims of teaching evaluation are to improve the quality of teaching and to ensure that students receive the best teaching which enable them to

effectively develop learning (Snell et al. 2000) and to demonstrate accountability to the public (Ory 2000). The perspectives of teaching evaluation could include: personality of teacher, teaching competences, discipline knowledge, and professionalism; these can also include input from teachers, students, service users (i.e. patients), and the institution (Jones 1989; Snell et al. 2000). However, it should be remembered that the more perspectives the evaluation covers the more resources and collaboration from stakeholders are required. It is important to utilise the most appropriate cost-effective strategy for evaluating teaching.

A number of methods have been employed to evaluate teaching; this includes self-rating, student rating, peer reviews of teaching, rating from colleagues, classroom visitation (Kulik and McKeachie 1975; Snell et al. 2000). Each method has its own strengths and weaknesses that need consideration. For example, student rating is found as valid, reliable, relatively free from bias, and covers a range of measurement perspectives (Marsh 2007; Clayson 2009); however, the data are only gathered from the student viewpoint which may not fully reflect every aspect of teaching. As for peer review of teaching, this method provides data relating to teaching competences and professional issues; it is also less judgemental and more constructive (Fernandez and Yu 2007). However, lack of standards for peer evaluation and problems with trustworthiness (unpredictable validity, reliability, and biases) are some examples of its disadvantages (Chism 1999).

Teaching is just one component of the UG-DentalEduc (see Chapter 2). Good teaching evaluation results and high teaching quality may not imply that the whole quality of UG-curriculum is good/high nor reflect that the goal of the curriculum is successfully achieved.

4.7.3 Programme Evaluation

A wide range of evaluation models have been developed to evaluate the quality of an educational programme or a curriculum. These models can be classified into several orientations based on the focus of evaluation: objective, management, consumer, expertise, adversary, and participant (Goldie 2006). Regardless of the orientation, one evaluation model, which is generally used and proven as useful in evaluating educational programmes in many health professional disciplines, is the CIPP model (Chavasse 1994; Leahy et al. 2009; Mohebbi et al. 2011). The model covers four areas of an educational programme: Context, Input, Process, and Product (Stufflebeam and Shinkfield 2007). However, arguably, this model only focuses on components and processes within an educational programme; it may or may not reflect whether the programme goals/outcomes have been achieved.

An evaluation model which is widely used for evaluating 'outcomes' of learners and of the programme is Kirkpatrick's Model (Kirkpatrick 1975; Wall 2010; Frye and Hemmer 2012). Regarding this model, an educational programme can be evaluated at five levels: participation, reaction, learning, performance, and outcomes (improvement of patient care). Many evaluations aim at the first and second because they are less complex and are easy to measure. In order to evaluate programme outcomes relating to the students, the third or fourth level would be more appropriate as they directly reflect student achievement. However, if an aim of dental education is to provide competent dental professionals to serve the society, the evaluation needs to focus on the highest level (i.e. how dental education improves people's oral health); although it is difficult to measure.

4.7.4 Implications for Dental Educators

Evaluation is fundamental for quality improvement (Hobson et al. 2008); however, it is also problematic. Teaching evaluation helps educators to improve their teaching and assessment strategies but it is not necessarily

true that high teaching quality relates to quality of the whole educational programme. Other components of an educational programme also need consideration. An evaluation model such as the CIPP model can provide data covering a rage of components of the programme; however, it could not indicate whether the programme achieve the outcomes/goals. The outcome model (e.g. Kirpatrick's Model) can demonstrate the programme achievement at the outcome level; though, it is difficult to measure the outcome directly due to the complexity. Moreover, student achievement could be a result of self-directed learning rather than high teaching quality. Thus, the question raised from this situation is what we (educators) should evaluate: teaching, programme components, or outcomes.

The above situation can probably explain why, although evaluation is crucial for identifying and improving quality of teaching and the UG-curriculum educators (Hobson et al. 2008), Hand (2006) found that evaluation is not perceived as an important issue for dental educators regardless of their roles. Educators may not recognise the real benefits of evaluation; instead, they possibly perceive evaluation as a threat. Similar to curriculum, evaluation is involved at different levels of an educational programme. If the goal of evaluation emphasises the quality of teaching and learning, educators would appreciate evaluation as relevant to their teaching performance. However, if the aim of evaluation is to improve the quality of the programme and be utilised at an administrative level, educators might not perceive evaluation as relevant to their careers and routine work. This issue is still controversial and require further research.

4.8 Educational Research

4.8.1 Research-Teaching Nexus

The impact of research on academic careers is a controversial issue which has been debated over time. Although recently, in the UK for example, teaching-oriented careers and development have been gradually recognised (Dearing 1997; HEA 2013), research is still perceived as important in a university context and unavoidable as a crucial part of both research-led and teaching-led careers (see Chapter 3). This is possibly a result of policy and development of European HE toward research and innovation (EHEA 2009). In this context, an important (and possibly the first priority) duty of a university is to focus on research and knowledge creation.

'Research-led learning' is equipped as a main educational strategy in many universities, in response to the European policy. In research-led learning, a curriculum is structured based on discipline knowledge; the emphasis of teaching and learning is on research content provided by educators through a variety of active learning strategies (e.g. discussion, project-based learning) (Healey 2005). It provides benefits for students to: gain deep learning; and develop employability, entrepreneurial, and lifelong learning skills (Brew 2003; Healey 2005). Research-led learning is also the heart of a Russell Group university in the UK where most UG dental curricula are based (The Russell Group). Research has been integrated into every part of an UG-curriculum, teaching and learning, and the university context. Regardless of roles and responsibilities, dental educators have to get involved in research-related activity within the UG-curriculum.

Fundamental relationship between research and teaching relies on the dynamic of knowledge; knowledge is generated through research by academics and is transferred to students via teaching (Brew 2003; Healey

2005). Educators may be an important part of both research and teaching; they need to be able to advance discipline knowledge and have an ability to convey knowledge to students effectively. Understanding of educational principles and research is essential for translating and transmitting knowledge to students (Healey 2005); within the research-led context, educators need to know what educational strategies are effective for helping students to learn and develop research-based knowledge as well as develop essential learning skills. In this situation, it can be argued that educational research is a bridge that links discipline research and teaching.

4.8.2 Dental Education Research

Dental education research is neither a compulsory requirement nor often beneficial for academic career development (Bertolami 2002). Although there is an increasing volume of educational research published in two international dental education journals (Sukotjo et al. 2010), this number is still small compared to the main stream dental-related discipline research. A study by Hand (2006) shows that understanding of educational research and research skills are not necessary for teaching-oriented educators. An opposing viewpoint was asserted by Srinivasan et al. (2011) that healthcare educators whose duties mainly relate to teaching roles need to be familiar with educational research. It is recommended that educators should be able to (1) provide effective teaching and learning strategies based on educational evidence and (2) innovate/develop a new educational method which can support student's learning (Oliver et al. 2008).

4.8.3 Implications for Dental Educators

Sometimes educators might perceive that research, teaching, and educational research are separate components and may not directly relate to UG-DentalEduc. However, the discussion above reveals that they complement each other and are essential for dental educators. While discipline research is crucial for knowledge creation (especially for dental

clinical practice), educational research is fundamental for transforming knowledge into effective teaching that enables students to develop deep learning and professional competence.

Although research is an integral part of the university context, teaching and how to provide effective teaching based on sound evidence (educational research) are also essential. A Russell Group university claimed that 90% of international students in 2008 perceived research quality as an important factor when choosing a university for their further education (The Russell Group). However, in the same report, up to 97% of international students perceived 'teaching' quality as an important factor (higher than research quality), but the Russell Group did not stress this explicitly. 'Research' alone may not be sufficient for being a world-class university and students still perceive that teaching is of greater importance than research.

For a specific group of educators who contribute to conducting dental education research, a further issue needs consideration. Bullock (2010) comments that although there is increasing recognition of social sciences and qualitative research in dental education, dental educators have not yet fully recognised the value of qualitative research due to its nature and paradigm. Qualitative research can be used to obtain information which involves personal, cultural, and environment issues; however, the process of judging the quality of a qualitative study is not reliant on scientific appraisal (Guba and Lincoln 2000). This explains why professionals from a scientific background (including dentistry) feel reluctant to believe in the results of qualitative research. For this point, Bullock (2010) suggests that it is necessary for dental educators to recognise that both quantitative and qualitative research have their own advantages and disadvantages. What is important is that the most appropriate methodology for the study is selected. Educators who get involved in dental education research need to be able to

make appropriate decisions about the approach they take to their educational research.

4.9 Educational Management and Leadership

4.9.1 Management vs Leadership

While management and leadership are intertwined and used broadly in the literature, both terms have different definitions and implications in the educational context. Table 4.6 provides a comparison between management and leadership based on the literature (Maccoby 2000; Townsend et al. 2008; Certosimo 2010).

Table 4.6 The differences between management and leadership.

Management	Leadership
▪ Planning and budgeting	▪ Motivating and inspiring
▪ Developing and evaluating processes and procedures	▪ Communicating a vision to others
▪ Organising, implementing a plan	▪ Setting directions and developing strategies
▪ Coping with complexity	▪ Coping with change
▪ Attending to staff issues	▪ Building trust
▪ Monitoring and problem-solving	▪ Selecting talent

Adapted from Maccoby (2000), Townsend et al. (2008), and Certosimo (2010)

These features imply that management relates to 'doing things right' or to ensuring that things have been done appropriately. In contrast, leadership focus on 'doing the right things' or to gear the organisation, processes, and development to the right direction in order to achieve the ultimate goals. Indeed, dental education requires people who are both managers and leaders for the sustainable development of dental professionals.

Developing a new dental curriculum to meet global standards requires skills of decision making, managing conflict (Oliver et al. 2008). Curriculum development and implementation usually involve a large number of stakeholders; hence, dental educators are required to possess leadership and management skills. These skills also can contribute toward quality improvement in dental education (Haden et al. 2006). In a broader aspect, Townsend et al. (2008) demonstrate that in order to balance the five roles of a dental school (education, research, professional-based function, oral health service, and administration), dental educators who are able to lead and manage all aspects of dental education are required.

4.9.2 Management and Leadership Issues in Dental Education

Global collaboration and mobility require dental institutions to share their resources including academic staff, so there is a need for dental educators who are able to work in different cultures and contexts and manage their career to support the global requirement (Corbet et al. 2008). The reduction in funding and support for dental education forces dental educators to access alternative sources of grant or sponsorship to support their teaching, research, and career development (Albino 1999).

Recently, most dental schools are facing the problem that, for various reasons, the number of dental academic staff is decreasing (e.g. lack of

interest in academic job, high workload, unsupportive tenure and promotional system) (Martin et al. 2010). Supportive systems, short-term, and long-term solutions are required to overcome this problem. Within the process of change and development in dental education, good management is essential for supporting the organisation, helping people overcome the change, and minimising resistance to change (Cohen 2005; Hayes 2007). Dental educators require not only educational competences to support their teaching roles, but also management skills to enable themselves and to help others to overcome change and development in dental education.

The need for leadership arises from a background of financial constraint. HE has gradually received less support from the government and a large number of dental schools now face fiscal pressures (Nash and Brown 2012). This financial constraint has been accompanied by increasing demands on dental education budgets, arising from, for example, advances in educational technology, curriculum revision (Albino 1999). At the same time, society demands more accountability from dental education. In combination, these elements (increased demands on a constrained budget coupled with greater accountability) create institutional and professional challenge and threatens to compromise the quality of dental education. This context demands leaders who are able to address this problem and gear dental education to be more productive and accountable to societal needs (Roth 2007; Certosimo 2010)

To overcome this challenge, leaders in dental education should be able to: lead an organisation in uncertain circumstances; build good relationships and collaborations within and beyond an organisation; and give emphasis to the institution's vision, missions, and outcomes (Albino 1999). Additionally, being a good role model in academic, healthcare, and institutional contexts as well as being an effective communicator able to inspire people in the organisation are important capabilities (Certosimo 2010).

4.9.3 Student Admission

As discussed in Chapter 2, competence is used not only for framing the process, (teaching/learning/assessment) but also for defining the input that includes the student admission and selecting process. The competence or learning outcome helps identify the kind of students who have the desirable characteristics of a good professional and have potential to be successful in the curriculum (Harden et al. 1999; Sefton 2004).

Previous literature mainly focused on the predictors of performance and measurement (e.g. prior academic performance, psychometric tests, skills and dexterity tests, interviews), the selection process (e.g. setting criteria), or recent admission trends (Duguid and Drummond 2000; Gaengler et al. 2002; Lopez et al. 2003; Ranney et al. 2005; Itaya et al. 2008). However, these predictors may not be the best indicators for student selection. For example, a study by Lynch et al. (2006) reveals that there is no association between student prior academic performance and their performance at the final dental examination; although, the study is limited to the one Irish dental school.

Recently, multiple mini-interviews (MMIs) are used for the student admission process in health professional education. By allowing candidates rotate around the series of questions, it is possible to assess candidates' competences in different areas (Pau et al. 2013). MMIs were found the be reliable, accurate, and high acceptability for using in medical and dental education (O'Brien et al. 2011; McAndrew and Ellis 2012). However, no study has investigated how student admission or MMIs can be used to recruit students who possess characteristics of a good leader and manager, which are essential for the future of the dental professional.

4.9.4 Implications for Dental Educators

Due to the recent constraints and need for leadership and management in dental education (Albino 1999; Corbet et al. 2008; Certosimo 2010), dental educators were urged to acquire essential skills to ensure that they are able to support the change and development in dental education. However, although the topics of leadership and management have been a fundamental part of an UG-curriculum (Sanz et al. 2008; Cowpe et al. 2010), it is not necessary that educators (who are dental practitioners) can fully transfer leadership and management skills to the educational contexts. Additionally, some educators are not part of the dental profession so they might not have fully understanding of the nature of UG-DentalEduc. The above discussion raises a question on what competences relating to leadership and management which dental educators need to develop.

In terms of student admission, it is essential to develop an appropriate admission and selecting system which enable a dental school to select and recruit students who have the potential characteristics and attributes of an effective leader. However, one might argue that not all educators get involved in student admission and selection process. This notion raises additional questions on (1) who need understanding of the issue relating to student admission and (2) what aspects of student admission of which dental educators need to be aware.

4.10 Educational Quality and Quality Assurance

4.10.1 Definition and Importance of Quality

Quality is a term which is difficult to identify. Quality can be seen as value, objective attributes, customer satisfaction, or achieved requirements and specification (Lagrosen et al. 2004). Regarding higher education, quality is perceived in five different ways: excellence, achievement, fitness of purpose,

good cost-effectiveness, or change and transformation (Harvey and Green 1993). Even in dentistry, there is no consensus on the term 'quality'; however, it is suggested that quality is an extent to which characteristics of something meets certain needs (Jones et al. 2007). There are several terms used in relation to the quality which are summarised in Table 4.7 (Schwarz 2000; Lagrosen et al. 2004; Hobson et al. 2008; WFME 2012).

Table 4.7 Terminology used in relation to the quality issue.

Term	Description
Quality Control (QC)	An operation to achieve the requirements.
Quality Assurance (QA)	An operation for providing confidence that the requirements are achieved.
Quality Management (QM)	An operation that includes QC, QA, and also quality policy, quality planning, quality monitoring, and quality improvement (QI).
Quality System	A process of performing QM.
Quality Cycle	A systematic process of QA and QI within an institution.
Standards	The criteria by which judgements and decisions are made.

Adapted from Schwarz (2000), Lagrosen et al. (2004), Hobson et al. (2008), WFME (2012)

One objective of the Bologna Process is to promote free movement and global competitiveness of the European region. For this issue, Hobson et al. (2008) assert that there should be an agreed system which can assure the standard of dental education throughout Europe. The authors explain several reasons why quality is important for developing European dental education:

(1) Quality can be used to demonstrate educational accountability to consumers, public, and government;

(2) Quality can be used to show the performance of an organisation; and

(3) Quality is an initial requirement for international educational collaboration including quality of graduates and standards of the teaching programme.

In the higher education context, QA is the focus of 'Quality' as it helps to ensure that the needs for high quality education are met.

4.10.2 Process and Dimension of Quality Assurance

Recently, a society requires an institution to demonstrate more accountability and transparency (i.e. how money is spent efficiently) (Dornan et al. 2011). As a result, the institution needs to review and improve quality of an educational programme regularly by implementing the QA process, which comprises four processes: accreditation, accountability, benchmarking, and self-regulation (Jones et al. 2007; Hobson et al. 2008).

Accreditation is a process in which an external authority assesses whether an educational programme meets standards or criteria for authorisation or certification. It aims to improve outcomes of an institution (Van Zanten et al. 2008). Accountability focuses on improving efficiency of a programme by considering the use of resource and value of money. Benchmarking is an evaluation of processes within a programme in relation to 'best practice'; it indicates performance of an institution. Finally, self-regulation is an evaluation process set within an institution for maintaining and improving educational standards.

There are a number of aspects in educational systems which are covered by QA: curriculum, teaching and learning, designing of learning activities, support for students, assessment and feedback to students, learning environment, integration of research and professional activities, evaluation process and management system (Corrigan et al. 2010; WFME 2012). One aspect of QA that directly relates to the teaching role of educators is the quality of teaching. Fincher et al. (2000) proposed six criteria for quality teaching:

(1) Learning objectives need to be clear, achievable and measurable;

(2) Educational materials need to relate to learning objectives and be appropriate to the competence level of students;

(3) Teaching methods and assessment need to be congruent with learning objectives;

(4) The assessment needs to focus on student performance;

(5) The quality of instruction needs to be assessed;

(6) The critical analysis to support and improve teaching quality needs to be conducted regularly.

Alternatively, it is possible to categorise aspects of QA in (dental) education into three dimensions: structure, process, and outcome (Jones et al. 2007; Hobson et al. 2008). Although they refer to quality of care, they can possibly be applied in an educational context. Here, structure includes physical resources, facilities, and staff within an institution. Process mainly focuses on the educational process (e.g. teaching, assessment, and environment). Outcome refers to the result of the educational process (i.e. the graduates). In short, QA is an essential part of the curriculum that relates to not only structure and function of the institution, but also all stakeholders within the institution (including educators).

4.10.3 Implications for Dental Educators

Many QA frameworks in education are developed based on the industrial model which focuses on administration and service functions rather than quality of education (Becket and Brookes 2008); the true value and advantages of QA could be compromised. Normally the evidence needs to be prepared in the form of documentation (Thune 2005); and educators might perceive this as an extra paperwork.

Educators should not perceive this as an additional task or burden for their academic career. They have to realise that it is the process which could help them to monitor and improve their teaching and quality of the curriculum from which students can benefit for their learning. However, there is still a lack of studies in how to gain educators' positive attitudes toward QA.

4.11 Patient Care and Healthcare System

4.11.1 Standards of Practice and Clinical Teaching

Within the evidence-based oral healthcare (EBOHC), both students and practitioners (including educators) have opportunities to develop essential skills for lifelong learning (e.g. critical appraisal, self-assessment) (Winning et al. 2008). It is suggested that educators need to practice EBOHC and be able to teach their students how to perform EBOHC by utilising several educational strategies (e.g. role model, small group learning) (MacEntee 2010).

In clinical teaching, students' professional competences and practice outcomes are assessed against standards of practice under professional regulations and system (GDC 2011) which are congruent with current research, evidence, and intervention (Shapiro and Coleman 2000). This

reflects that teaching and learning in clinical dentistry covers not only educational components (e.g. teaching/learning, assessment, student-educator relationship) but also patient care, professional standards, and the healthcare system. Educators need to understand the healthcare system, process, regulation, and standards that can be used to inform their teaching and support student learning (Harris et al. 2007; Bullock et al. 2010).

4.11.2 Implications for Dental Educators

The practice of EBOHC is similar to evidence-based medical practice which comprises several steps including identifying problems, literature search, critical appraisal, evidence application, and self-evaluation (Hackshaw et al. 2008; Winning et al. 2008). Indeed, it is also possible to see EBOHC practice as a process of how to integrate knowledge and evidence from different disciplines into real practice/teaching. For this notion, EBOHC is probably a part of research-teaching nexus (see Topic 4.8.1). Therefore, the relationship between research, teaching, and practice can be demonstrated through the EBOHC practice.

Students can learn effectively when they understand how to relate their knowledge with a real problem (Jordan et al. 2008). Understanding of the patient care and healthcare system might support students to develop a better understanding of professional practice and duty. Dental educators, hence, at least need to possess basic knowledge in dental professional and healthcare contexts which enables them to support students learning effectively. However, non-clinical educators may not need to develop knowledge or competences in patient care and healthcare system as their teaching practice and environments do not involve clinical contexts. Developing the understanding of the patient care and healthcare system for dental educators is still an on-going debate.

4.12 Educational Professionalism

4.12.1 Defining Educational Professionalism

Professionalism is defined differently, depending on the disciplines and contexts. For example, in medical education, professionalism is "*a set of values, behaviours, and relationships that underpin the trust the public has in doctors, with doctors being committed to integrity, compassion, altruism, continuous improvement, excellence and teamwork*" (Tallis 2006, p. 8). In dentistry, professionalism is *"a display of high intellectual, technical and moral qualities and abilities, in service to patients and community"* (Masella 2007, p. 207). There is no agreed definition for the term professionalism itself (Hargreaves and Goodson 1996); it can be interpreted in different ways and have different meaning to different people (Evans 2008).

In the educational context, which is a focus of this research study, the definition of educational professionalism has not yet unanimously agreed. Educational professionalism is seen as a combination of attitude, behaviour, and communication skills of educators (Kramer 2003). From a different perspective, Carr (2013) asserts that professionalism in teaching stems from the relationship between ethics and teaching practice. A similar emphasis on ethical dimensions of teaching professionalism has also been discussed in the literature (Caetano and Silva 2009; Mondal and Roy 2013). However, it is argued that expert knowledge is a profound core of professionalism and its relation to ethics; it contains both subject knowledge and knowledge in education (Seery 2008). In other words, educational professionalism from this perspective is both what to teach and how to teach. In a wider sense, educational professionalism can cover the roles of educators in an institution and the responsibility for personal and professional development (Hesketh et al. 2001; COPDEND 2013a).

The above discussion reveals that educational professionalism relates to characteristics of effective educators and teaching. It includes attributes of educators, knowledge and expertise, ethics and professional conduct, and continuous professional development. In this study, educational professionalism mainly focuses on what makes an effective educator instead of attempting to identify the exact definition of professionalism.

4.12.2 What Makes an Effective Educator?

From the student perspective, important characteristics of effective educators include dedication to quality of care, honesty, integrity, positive attitude toward students, respect to students, and positive interaction with other colleagues (Elzubeir and Rizk 2001). Educators need to express enthusiasm for teaching and learning and develop good relationships with students (Hesketh et al. 2001). Positive attitudes towards educational roles and ethical behaviours are essential to encourage students to develop learning and professional competences (Bullock et al. 2010). Educators need to be caring and supportive in order to develop good feeling and morale within students (Paukert and Richards 2000). Awareness of equality, diversity, and sensitive issues is crucial for educators. Educators need to ensure that students are equally treated and student diversity is respected (Harris et al. 2007; AoME 2011). From these examples, it can be concluded that (1) positive attitudes and ethical behaviours towards students, colleagues, and teaching roles and (2) awareness of diversity and equal opportunity are key characteristics of effective educators.

These characteristics can be demonstrated through educators being good 'role models' (Paukert and Richards 2000; Elzubeir and Rizk 2001). Sometimes tacit knowledge and the hidden curriculum might enable students to develop professional attributes and competences unconsciously. For instance, students develop learning by observing their educators dealing with patients and imitating behaviours their educators perform. Regarding this

notion, being a good role model is essential especially when educators get involved in clinical teaching.

In addition, other competences are required for being effective educators. For example, educators have to possess good clinical and technical skills in order to be good role models for students to imitate, learn and develop professional competences in a real healthcare context (Elzubeir and Rizk 2001). Communication skills are also considered important for providing effective teaching and collaborating with colleagues and supporting student learning (Paukert and Richards 2000). Educators should commit to personal and professional development which is important for improving their competences and maintaining high quality teaching (Hesketh et al. 2001; Bullock et al. 2010).

A study by Hatem et al. (2011) reveals that the characteristics of an effective educator comprises attributes, skills, and knowledge which is relevant to the literature review in this topic – Educational Professionalism. This section illustrates attributes and skills of effective educators. In the next section, knowledge required for being an effective educator is discussed.

4.12.3 Content Experts vs Process Experts

It is suggested that educators should possess knowledge in subject matter (including clinical knowledge) in order to be able to transfer information to students and correct student's misunderstanding (Irby 1994). Content knowledge is also essential for large group teaching or other educational methods which require educators to provide knowledge that cannot be found easily in other resources to students (Brown and Manogue 2001). The benefits of content expertise are: it supports students to develop in-depth discussion and critical thinking skills (Neville 1999; Azer 2005). it helps students develop a deep understanding by providing an insight on a specific

issue (Yee et al. 2006). However, content expertise can interfere with student learning specially in a small group as educators might giving too much information or dominate the learning process instead of facilitating student-led learning (Davis and Harden 1999).

Process expertise (i.e. effective facilitating) supports student learning better than content expertise (De Grave et al. 1999) as it assists educators to be able to facilitate, encourage, and motivate student individual and collaborative (Khan and Coomarasamy 2006). However, it could be argued that sometimes if educators have lack of insight in subject knowledge, they might not be able to correct misunderstandings arising during the session.

4.12.4 Implications for Dental Educators

According to the literature, although the definition of professionalism has not yet been agreed, it is possible to perceive educational professionalism as a wide range of attributes, skills, and knowledge of effective educators as well as ethics and professional issues essential for teaching practice. Educational professionalism could be clarified using the holistic education concept – 'head, hands, and heart' (Easton 1997) and the outcome-based model for clinical educators (Hesketh et al. 2001) as a metaphor. Effective dental educators need to have both subject and educational knowledge – 'Head: Doing the thing right'. They need to possess skills essential for teaching and support student learning – 'Hands: Doing the right thing'. Finally, dental educators need to have attributes of the teaching professional – 'Heart: The right person do it'. In summary, Educational professionalism should not be seen as an isolated collection of professional attributes; rather it needs to be considered as fundamental for all educators (Singh et al. 2013).

4.13 Literature Gaps

The review in Chapter 3 and this chapter has revealed a variety of educational competences which dental educators need to develop. However, there are many issues which are controversial or have not yet been fully explored. The controversial issues found in the literature include, for example:

(1) While reflective practice, experiential learning, and SDL are fundamental for developing professional competences, there is a scarcity of evidence to support that these educational principles directly improve clinical outcomes;

(2) Outreach and interprofessional education are beneficial for students to develop collaborative learning and holistic patient care. However, the cost-effectiveness and quality control of these educational strategies are still questionable;

(3) There has not yet been an agreed answer on the questions: (a) whether a student-centred strategy or a teacher-centred approach is more effective; (b) whether small-group learning is more beneficial than large-group teaching; and (c) whether content expertise or process expertise provide better learning to students. This is because each educational strategy has its own advantages and disadvantages, and also depends on the contexts;

(4) Student support, curriculum, evaluation, QA, and healthcare system seem to be essential for educators to support their roles and responsibilities within UG-DentalEduc. However, not all educators have to get involved in these issues.

The issues which have not been fully understood include, for example:

(1) How dental educators provide educational resources and materials to support students at different stage of the novice-expert continuum;

(2) How dental educators help students to deal with tacit knowledge and develop deep learning;

(3) What aspects of leadership and management are relevant to and essential for dental educators.

The above issues create a difficulty in identifying what educational competences are essential for dental educators and creating a training programme for them. As a result, this research project attempted to close the literature gaps by identifying the educational issues and competences in which all dental educators need to be competent (Research Objective 1) and the competences in which their importance depends on local context and may not be relevant to all educators (Research Objective 2).

It is also suggested that local contexts especially the socio-cultural factors can influence teaching, learning, and the development of educators (Hofstede et al. 2010). This may be an underlying reason for the controversial issues discussed above. The socio-cultural factors relating to education will be discussed in the next chapter.

Chapter 5 Culture and Dental Education

The previous chapter provided a comprehensive view on the roles and competences of dental educators. Teaching and learning in dentistry involves many factors in addition to the interaction between students and educators (including environment, patients, socio-cultural contexts). Educators need to be aware of these factors and understand their influences on dental education. A factor which significantly influences education is culture (Hofstede 2011). Culture plays an important role in shaping student learning and teaching strategies (Parrish and Linder-VanBerschot 2010). This chapter presents the nature of culture and how it influences educational practice. The chapter comprises four sections: definitions of culture, European cultures, cultural influences on educational practice, and cultural competence.

5.1 Definition and Components of Culture

5.1.1 What is Culture?

Culture is "*the collective programming of the mind that distinguishes the member of one group or category of people from another*" (Hofstede et al. 2010, p. 6).

A number of writers describe 'culture' from different perspectives. At a broader level, culture covers a number of areas, including arts, crafts, education, language, customs and institutions (AAMC 2005; Kawar 2012). At a specific level, culture is: the ways of thinking, the behaviours and values which are shared among groups (Lim 1995; Betancourt 2003; Boode 2005). It is a set of behaviours that allow individuals to understand the world (Seeleman et al. 2009), or possibly a set of values which governs individuals

and the world around them (Miroshnik 2002). Jordan et al. (2008) use an iceberg as a metaphor of culture. The visible part of the iceberg indicates the visible behaviours of individuals, while the sub-surface iceberg refers to the beliefs, values, and attitudes within individuals that control the behaviours.

Several authors argue that all members within a culture do not have similar behaviour patterns or values (Guild 1994; Watkins 2000). Hofstede et al. (2010) argue that human behaviours are influenced not only by culture, but also personality and experience. As for the personality, it is a unique characteristic of individuals which they do not share with other human beings; it is in part inherited, but can be learned from life experience. Hence, to re-emphasise, it is not necessary that all people in the same culture share similar characteristics.

Culture on its own may not be sufficient to explain human behaviours at the individual level. However, at the societal level, culture can affect the ways people react to education, especially teaching and learning (Hofstede 2011). Consequently, it pays to be aware of the influences of culture on people's learning behaviours, as well as educational beliefs and values.

5.1.2 Cultural Models

In order to understand how culture relates to group behaviours, several cultural models have been proposed. A field study conducted in 1961 identified six basic cultural orientations describing human patterns within a culture (Tax and Kroeber 1965): the nature of humans, relationships among people, relation to broad environment, activity, time, and space. The model claims that individuals are the 'holders' of the preference and cultural pattern; all dimensions are available in all societies. The model was validated by Maznevski et al. (2002) and claimed as beneficial at the individual level of analysis. However, this model might be contested because, while focusing on

individuals, it may not reflect the group or national culture. Its benefit in broader contexts is questionable.

According to GLOBE (Global Leadership and Organizational Behaviour Effectiveness), who conducted a survey in 61 nations focusing on culture and leadership, the national cultures were analysed and categorised into particular regions (e.g. Anglo-Saxon, Eastern Europe) (House et al. 2002). This model provides a comprehensive view of cultures, and substantiates insight from previous models. Additionally, there are several overlapping dimensions which compromise the validity of the results (Hofstede 2011). From the educational perspective, the model may not provide beneficial implications, because it only focuses on businesses.

Parrish and Linder-VanBerschot (2010) developed cultural dimension of learning framework from several published cultural models. The model outlines cultures relating to teachers' instructions and students' learning behaviours. The main benefit of this model is that it represents a relationship between culture and education. However, the main drawback of this model is that it was developed based on literature review, not on empirical research. It does not provide information regarding national or regional cultures. The validity and applicability of the model is not yet defensible.

In light of the above, a number of cultural models have been developed and published. There is still no 'best' model that can perfectly explain human cultures and their influences on education. It is important for educators to consider the 'most appropriate' cultural models which are congruent with the educational environment. The next section will present and discuss the cultural model which is most appropriate for educational contexts and this research project.

5.1.2.1 Hofstede's Cultural Dimension Model

One cultural model which is widely used and referenced to explain human cultures is Hofstede's cultural dimension model (Hofstede et al. 2002; Hofstede et al. 2010; Hofstede 2011). The model represents 'National Culture', which describes beliefs, values, and behaviours of people within a country. In this model, culture is categorised into six dimensions: Hierarchy, Identity, Gender, Truth, Virtue, and Happiness (Table 5.1). Each dimension comprises two different poles.

The first four cultural dimensions were developed from a study which conducted a questionnaire survey on 88,000 people working in 66 countries in the 1960s (Hofstede et al. 2010). Later the study was extended to 74 countries and the last two dimensions were developed.

Although the authors do not use the term 'Happiness' to label the last dimension, they refer to another original study called 'Happiness Research', which they analysed when developing this dimension. Hence, in this research project, I decided to use the term 'Happiness' to label the last dimension of the Hofstede's Cultural Model.

The data collected for developing the model were statistically analysed to provide scores defining the degree and pattern of people's behaviours and beliefs in each country. Then the countries were ranked based on the scores. The model illustrates comprehensive information of national cultures which has been being used in cross-cultural research for decades.

Table 5.1   The cultural dimension model.

Dimension	Definition
Hierarchy (Small Power Distance vs Large Power Distance)	This dimension demonstrates inequalities and unequal distribution of power (power distance) between people within a culture, which is expressed by how people handle these inequalities. In a culture where the power distance is small (SPD), people try to equalise the power. They require justification for the use of power. In large power distance (LPD) cultures, people accept the inequalities of power without a need for justification. For example, teachers have more power than students, so students must obey their teachers.
Identity (Individualism vs Collectivism)	This dimension explains the relationship between individuals and the group they belong to. One side of the dimension is 'Individualism', representing a loose social framework where individuals need to take care of themselves; while the opposite side – 'Collectivism' – reflects individuals as a part of the society, where they are expected to take care of and show loyalty to other people.
Gender (Masculinity vs Femininity)	This dimension highlights gender roles and the control of aggression within a culture. It refers to the distribution of values between genders, rather than the characteristics of individuals. The masculinity pole demonstrates preferences for achievement, assertiveness and reward for success – while the femininity pole stands for modesty, caring and quality of life.
Truth (Low Uncertainty Avoidance vs High Uncertainty Avoidance)	This dimension focuses on how people cope with ambiguity or unpredictable situations. Low uncertainty avoidance (LUA) cultures represent people who are flexible and have a more relaxed attitude - while high uncertainty avoidance (HUA) cultures indicate that people are intolerant of unconventional circumstances.
Virtue (Short-Term Orientation vs Long-Term Orientation)	This dimension has its roots in the Confucianism philosophy in China and has been found to correlate with the economic growth of a country. It reflects the concerns of truth, work, perception of the time, and how people deal with the future (i.e. control the future or let it happen). Short-term orientation (STO) indicates that people think about consequences of their actions only in the present situation (i.e. take each day as it comes). In contrast, long-term orientation (LTO) indicates that people are concerned about future situations (i.e. planning ahead for a better future).
Happiness (Indulgence vs Restraint)	The last cultural dimension represents the gratification of basic human desire. The indulgence pole presents relatively free gratification, while the restraint pole reflects the control of gratification in a society.

5.1.2.2 Critiques of the Hofstede Model

Despite its popularity, the Hofstede model has been subject to intense debate on its quality and applicability. A number of controversial issues were raised and contested by several reviewers. For instance, Javidan et al. (2006) challenged that the model is too simplistic and that the results which emerged from the data collected from four decades ago may not still be valid. Certainly Information Technology (IT) has massively impacted upon modern human societies and, particularly for this research context, dental education (Schleyer et al. 2012; Khatoon et al. 2013). However, the Hofstede model does not consider the inter-relationship between IT and cultures. Furthermore, assuming that all people within a nation share similar culture is a misconception, because each nation contains a variety of sub-cultures and its cultures are influenced by many factors (Baskerville 2003). In terms of methodological rigour, Blodgett et al. (2008) comment that the Hofstede study contains a lack of face validity, construct validity, and reliability, and argue that it is not valid at the consumer level of analysis.

From my personal viewpoint as a researcher, culture is subjective and consists of both observable (behaviours) and intangible (values) components; therefore, representing the culture using scoring derived from statistical analysis may not demonstrate the real nature of culture, as it is difficult to capture subjective issues by using quantitative methods. It is important to acknowledge that the Hofstede model only demonstrates general trends and characteristics of people, but does not reflect some variations within the culture (e.g. sub-cultures).

Nevertheless, many authors assert that this model still provides great benefits for cross-cultural research. The model gives in-depth understanding of human values rather than providing general beliefs and practices; hence, the notable increase in the use of this model outside social sciences disciplines (Baskerville 2003; Zakour 2004). Williamson (2002) argues that

although the Hofstede model possesses certain fallacies and disadvantages, it provides valuable insights regarding national cultures over other models and allows further exploration of social phenomena. On balance, in relation to the context of this research project, I decided to use the Hofstede cultural dimension model as a framework to describe European cultures and their relationship to and influences on European dental education.

5.2 European Cultures

In this section, the general characteristics of people in each cultural dimension of the Hofstede model are thoroughly represented along with the ranking of some European countries within each dimension (Table 5.2 to 5.7) (Hofstede et al. 2010; Hofstede 2011). The ranking is used only to illustrate the relative comparison between European countries which relate to the context of this research project.

Table 5.2 Characteristics of people in the 'Hierarchy' dimension and the ranking of European countries within the dimension.

Table 5.3 Characteristics of people in the 'Identity' dimension and the ranking of European countries within the dimension.

Table 5.4 Characteristics of people in the 'Gender' dimension and the ranking of European countries within the dimension.

Table 5.5 Characteristics of people in the 'Truth' dimension and the ranking of European countries within the dimension.

Table 5.6 Characteristics of people in the 'Virtue' dimension and the ranking of European countries within the dimension.

Table 5.7 Characteristics of people in the 'Happiness' dimension and ranking of European countries within the dimension.

Since the establishment of the EU, the free movement policy has allowed European citizens to migrate across Europe. This situation encourages cultural exchange and integration, which has changed Europe to be one of the most complex multicultural areas in the world. Europe comprises a mixture of people and cultures; it may not completely reflect the area-specific cultural traits as represented by cultural models and recent research.

In this study, I acknowledge that Europe is multicultural; however, it is still beneficial to consider area-specific cultures, especially from the Hofstede model, because it can provide better understanding of a general pattern of behaviours, beliefs, and values which are relevant to educational contexts. Moreover, area-specific cultures also give insight of historical and other factors which influence the European cultures. Therefore, in this research study European cultures are categorised into four areas (Northern/Southern/Eastern/Western) using the classification by the United Nations and are explained based on the Hofstede model. The next section will explore culture's influence on educational practice, especially on student learning styles.

5.3 Cultural Influences on Educational Practice

An important aim of education is to help students in developing learning and, particularly in dentistry, developing professional competences (Chambers 1994). It is essential to understand how students learn, as well as how to tailor teaching and learning strategies to enhance student learning (Chambers 1998). Individual behaviours and values are factors that influence the way students learn. The Hofstede model provides cultural traits of people in different cultures to explain the above notion. Several research studies identified relationships between cultures and student learning styles, especially between Western (Anglo) and Eastern Asian cultures.

However, this research project focuses on European culture and learning, which still lack research evidence in this area. One might argue that the studies on Anglo-Saxon and Asian cultures may not be applicable to explain the nature of European cultures toward learning. However, Northern and Western European countries share many features of Anglo-Saxon cultures (Ashkanasy et al. 2002; Szabo et al. 2002). Southern and Eastern Europe have cultural backgrounds primarily stemming from Greco-Roman Culture, Islamic culture and some of the Asian cultures (e.g. Confucius) (Rahim et al. 2008; Ostergren and Le Boss 2011). Thus, it is possible to explain some cultural patterns in Southern and Eastern Europe based on Asian cultures.

Therefore, in this research, Northern and Western European cultures are discussed using the studies on Anglo-Saxon culture while the studies on Asian culture is used to outline cultures in Southern and Eastern Europe.

5.3.1 The Western and Eastern Ways of Learning

Based on Kolb's learning style model (see Chapter 4), several studies found that students from Western cultures (SPD, Individualism, Masculinity, LUA, STO) grasp knowledge through feeling (concrete experience) and develop learning by acting (active experimentation); while students from Eastern cultures (LPD, Collectivism, Femininity, HUA, LTO) grasp knowledge via thinking (abstract conceptualisation) and develop learning by reflection (reflective observation) (Yamazaki 2005; Charlesworth 2008; Joy and Kolb 2009).

The Western ways of learning are summarised in Table 5.8 based on the literature (Phuong-Mai et al. 2005; Park and Kim 2008; Hofstede et al. 2010; Hofstede 2011).

Table 5.8 The Western ways of learning.

Dimension	Description
SPD (Small Power Distance)	▪ Students are not dependent on educators. ▪ Educators are learning facilitators who support learning, rather than directors who control and frame student learning. ▪ Students actively participate in a group and are confident to express their opinions, disagreements and criticisms in front of their educators.
Individualism	▪ Students care most about their work and personal achievement and are eager to take responsibility for their own learning. ▪ Students prefer a straight-forward conversation to initiate and maintain in-depth discussion during a session.
Masculinity	▪ Students are driven by academic success and learning, and the sense of achievement. ▪ Student-centred learning is an effective strategy to motivate student engagement and learning.
LUA (Low Uncertainty Avoidance)	▪ Students respect and accept different opinions and perspectives from others. ▪ Students have an ability to cope with uncertainty and argumentative discussions. ▪ The use of ill-defined and low-structure context in an active learning session is an effective strategy for developing collaborative learning.
STO (Short-Term Orientation)	▪ Students set an immediate learning goal and actively participate in a group from the beginning of the session, so as to achieve the goal.
Indulgence	▪ Students are eager to express and share opinions with others and are comfortable to contest traditional beliefs and values.

Undoubtedly, student-centred learning, which is developed based on constructivist and humanist principles, where students have control of their life and freedom to learn (Jordan et al. 2008), are congruent with the nature of Western students and can effectively enhance student learning.

In contrast, Eastern students have the ways of learning different from Western students in several issues. The Eastern ways of learning are summarised in Table 5.9 based on the literature (Kember 2000; Watkins 2000; Park and Kim 2008; Urubshurow 2008; Hofstede et al. 2010; Hofstede 2011).

Table 5.9 The Eastern ways of learning.

Dimension	Description
LPD (Large Power Distance)	▪ Students are dependent on educators. ▪ Students accept educators' role in outlining and transferring knowledge; they need to obey and believe in everything that educators teach. ▪ Inferior students have a lack of opportunities to express their opinions, or are not allowed to argue with superior students.
Collectivism	▪ Indirect communication is often used to prevent negative emotion, save others' 'face' and avoid losing own 'face'. ▪ The aim of education should emphasise the development of skills and competence for being accepted as a part of a group.
Femininity	▪ Students believe that one should not do anything to hurt people or make others feel uncomfortable, both physically and mentally. ▪ Students tend to avoid argumentative discussion and challenging each other in order to prevent tension, maintain positive environments and create harmony within a group.
HUA (High Uncertainty Avoidance)	▪ Students prefer learning in a well-defined context with clear directions because uncertainty is perceived as a threat. ▪ The use of ill-defined context with complex problems in HUA cultures can discourage student learning.
LTO (Long-Tern Orientation)	▪ Students invest resources and work hard for their long-term learning and better future, rather than for immediate results. ▪ Students may not actively engage with a session unless they have established trust and stability within the group.
Constraint	▪ Students lack of freedom of expression because they are afraid of the negative consequences created by the threatening use of power by educators.

Students tend to develop passive learning styles which allow them to listen, observe, and reflect on learning, without having interactions with others. This is a good way for avoiding confrontation with power inequality and for creating harmony learning environment. If students are placed into an active and open discussion, it may cause high levels of stress and constraint. It implies that the nature of Eastern cultures may not be congruent with student-centred active learning; rather teacher-centred approach may be more appropriate to support student learning.

5.3.2 Controversial Issues on Western and Eastern Ways of Learning

Put simplistically, the previous discussion implies that Western students develop learning through active engagement and participation, while Eastern

students adapt passive styles of learning. Student-centred active learning is congruent with Western cultures; however, for Eastern students, teacher-centred passive learning is still valued. The main barrier for Eastern students adapting themselves toward student-centred learning probably comes from students' behaviours and beliefs which are embedded from family, school and society. In Chapter 4, it was observed that student-centeredness provides benefits to learning over teacher-centeredness. It possibly infers that Western students can develop a better learning than Eastern students.

However, this immediate assumption is simplistic. In terms of Western cultures, it is claimed that in individualistic cultures, learning is driven by personal success (intrinsic motivation), which helps students gain academic success (Hofstede et al. 2010); this can however create ego and a sense of self-centredness (Watkins 2000). These by-products possibly compromise collaborative learning and group dynamics, as students care about themselves more than group achievement. Similarly, masculine cultures can create a high level of competition amongst students. It can enhance the negative effects of individualistic cultures, in that students compete with each other only for personal success. Some students may be left behind and develop learning difficulties and problems. In STO cultures, although students actively participate in a group from the beginning of a lesson, it was found that the level of engagement and contribution gradually decreases over time (Phuong-Mai et al. 2005). One possible reason is that STO cultures focus on short-term achievement; when an immediate goal (e.g. a core learning outcome) is achieved, students begin to lose interest in, or motivation, for further learning. This suggests that group learning and effectiveness can be compromised at the later stage of learning.

In short, most Western students are capable of student-centred learning; however, not all students necessarily prefer to learn merely by this approach. The nature of Western cultures can compromise the effectiveness of group-

based active learning. It cannot be generalised that Western students develop better learning through active learning than Eastern students.

As for the Eastern cultures, several studies show that cultural traits of Eastern students can support and enhance student-centred learning. Some cultures develop strategies which effectively reduce the power distance among group members and improve group dynamics. In one Eastern culture for instance, in a meeting, individuals tend to treat other members as if they were kin (e.g. brother-sister) (Holmes et al. 1995). It creates a relaxed environment and lessens the formality of communication, as well as introducing a sense of trust and belonging. It can greatly encourage better discussion and engagement. Additionally, students can effectively learn from student-centred learning when they are familiar with and clearly understand what they need to do in the learning process (Choon-Eng Gwee 2008).

It has been suggested that Eastern students can appreciate and gain benefits from Western learning strategies (e.g. active learning), if they are provided with sufficient time and appropriate support that allows them to develop strategies to cope with the new strategies (Kember 2000; Wong 2004). A study by Phuong-Mai et al. (2005) showed that, the level of engagement of Eastern student gradually increased over the time. At the later stage of the session, Eastern students participated more in the group and gained learning achievement better than Western students. This can be explained as when students are familiar with the group and environment, they are able to lessen the power distance and take more control of the learning situation. Students begin to gain mutual trust among group members which allows them to be comfortable with and confident in engaging with open and argumentative discussion. This could also enhance collaborative learning and group dynamics.

In summary, potential barriers in Eastern cultures to student-centred learning are LPD and HUA cultures. If they are reduced or eliminated, Eastern students are able to learn and be able to gain high academic success through student-centred learning. Time, resources, and support for students to develop appropriate learning strategies are essential. Therefore, it can be asserted that Eastern students can gain benefits and learning achievement from active learning, as much as Western students.

5.3.4 Western and Eastern Perceptions about Learning

According to Watkins (2000), in Western cultures, 'understanding' is perceived as a 'sudden insight' (i.e. understanding occurs at a specific time). Learning is a result of an ability of individuals to gain sudden insight. Learning is skill-dependent and students need essential skills which enable them to develop learning. This possibly explains why Western educational philosophy focuses on student-centeredness and active learning, as they believe that interactions and group activities allow students to develop 'skills for learning'.

In Eastern cultures, in contrast, 'understanding' is a 'process' for discovering meaning. It requires time and reflection on a particular issue (Kember 2000). Learning is a result of hard work and cognitive effort, rather than an ability to gain insight (Watkins 2000). While students require cognitive ability to reflect on information, 'what needs to be learned' is possibly more important than 'skills for learning'. Thus, students use the listening process to grasp understanding, and then use thinking processes (i.e. reflection) to develop learning. They may perceive that active engagement is not an effective strategy for listening and thinking. This notion supports previous literature which reveals that Eastern students possess assimilating learning style (see Section 5.3.1). From the Western perspective, the strategy used by Eastern students can be perceived as passive learning, although it involves higher-ordered thinking skills.

In order to develop learning, Eastern students utilise repetition and memorising as the main strategies. Repetition is an initial process of accumulating and familiarising information which leads to a memorisation process where information is stored and ready for retrieving in the future (Kember 2000). In Eastern cultures, memorisation provides students with a pool of information (facts), and enables them to develop critical reflection, understanding, and meaningful learning (Watkins 2000). It can be asserted that this process is strategic learning, as students begin remembering all the information and identifying and selecting information relating to a problem or context; subsequently develop learning from relevant information. The lack of engagement of Eastern students at the beginning of active learning is probably the result of students trying to develop fundamental knowledge through cognitive processes, rather than learning through interactions (Phuong-Mai et al. 2005).

One might argue that if deep learning has been developed, it is possible to transfer knowledge to apply to other contexts (Jordan et al. 2008); hence, Western students could possess better skills to apply knowledge into other contexts because they have more essential skills for learning. However, it can be argued that knowledge transfer also requires understanding of the contexts (Lynch et al. 2006; Kaufman and Mann 2010). Repetition and memorising may enable Eastern students to gain understanding of contexts. As a result, Eastern students may have more prior knowledge (a pool of information) and understanding of contexts than Western students.

If the learning process involves only repetition and memorising without reflection and selection of relevant information, it is definitely passive learning. In this case, it can firmly be asserted that passive learning is less beneficial than active learning. However, according to the different perceptions of learning between Western and Eastern cultures, it is not possible to indicate whether Western learning or Eastern learning is more

effective. Western culture's emphasis on skills for learning and learning through active engagement are congruent with social constructivist and humanist learning theories – where learning is based on an individual's capability to learn and how individuals interact with others and environments (Jordan et al. 2008). By contrast, Eastern culture emphasises cognitive ability and reflection, which relates to cognitivist and radical constructivist theories where learning is based on memory and the ability to make meaning of information (Ertmer and Newby 1993; Karagiorgi and Symeou 2005). Although they focus on different aspects, both Western and Eastern learning comprise active learning components which are effective and beneficial for learning.

In conclusion, Western students tend to develop learning through 'skill-based active learning' while Eastern students utilise 'cognitive-based active learning' as a main learning strategy. Both approaches have their own strengths and weaknesses depending on contexts and cultures, and they can complement each other. It is essential for educators to acknowledge students' backgrounds and educational contexts in order to provide appropriate active learning strategies to enhance student learning.

5.3.5 Are Learning Styles Fixed with Cultures?

The previous section revealed that each individual has unique traits which closely link to personality and cultural background. It is possible to hypothesise that learning styles are fixed with individuals and cultures. This hypothesis is coherent with a study of Barmeyer (2004), which found that students from a similar heritage have similar learning styles. However, Wong (2004) argued that learning styles are not fixed, but adaptable. Educational specialisation (e.g. learning to be a profession) is one factor that shapes student learning styles (Joy and Kolb 2009). In the early years of university, learning focuses on general concepts and less-specialised contexts, with specific styles and approaches for learning not required. However in the later

stages, learning mainly emphasises on discipline-specific concepts within professional contexts. Students need to adjust and develop learning styles to be able to learn effectively in particular contexts. This implies that learning styles may not be completely fixed with individuals and cultures, but is influenced by learning contexts.

If learning styles are not completely fixed with cultures, and students can adapt their learning styles, this notion can lead to a controversial issue relating to European education. Education in Europe has been harmonised and is developing toward comparable standards while its diversity has been maintained. It raises the question of whether it is necessary for educators to adapt educational strategies to support diversity and different learning styles, or whether it is a responsibility of students to adapt their learning styles to match learning environments. Several studies reveal that although Eastern students face some learning difficulties after exposure to student-centred active learning, they can adapt themselves into the new learning environments within the first few months (Kember 2000; Holtbrügge and Mohr 2010). There is no need for local universities or educators to adapt educational strategies to suit non-local students (Wong 2004). However, some studies argue that educators rather, need to be aware of cultural diversity and need to provide educational strategies which are congruent with students' backgrounds (Barmeyer 2004; Charlesworth 2008). Because people possess limited ability to adapt themselves into a new environments (Hofstede et al. 2010), it implies that they may not fully adapt new learning styles and approaches to effectively develop learning.

Educational success within Europe is a result of mutual responsibilities between students and educators. Students need to adapt themselves and their learning styles to learn effectively in different educational contexts. Simultaneously, educators need to be aware of cultures and their influences

on student learning styles and provide culturally-appropriate educational strategies to maximise student learning.

5.4 Cultural Competence

An important role of educators is to be aware of cultural influences toward student learning. This role relates to the principles of 'Cultural Competence'. The key issue of cultural competence is that failure to acknowledge the cultural diversity or differences among groups of people can lead to stereotyping, bias, and discrimination (Betancourt 2003).

From the education perspective, cultural competence is *"the ability to successfully teach students who come from cultures other than your own."* (Diller and Moule 2005, p. 11). Cultural competence could enable educators to deal with cultural diversity in Europe. Educators need to be aware that cultural background can affect student learning and be able to recognise whether student learning behaviours are the result of cultural influences or internal traits (Parrish and Linder-VanBerschot 2010); cultural competence enables educators to gain essential knowledge and skills relating to this notion.

Literature provides a plethora of components of cultural competence (Carter 2001; Betancourt 2003; AAMC 2005; Diller and Moule 2005) which can be summarised into three domains: (1) attitude, which roots from the concepts of professionalism, (2) knowledge, which comprises understanding of multiculturalism and of students' specific cultures, and (3) skills, which relate to effective communication and adaptation of teaching skills to different cultural contexts.

One might say that developing cultural competence seems to be an additional burden for educators who already have high workload. However, it can be argued that cultural competence is an integral part of educational roles and competences. The core principle of cultural competence is that educators need to provide education which is congruent with students' backgrounds (Diller and Moule 2005). Literature in educational professionalism and standards for educators also articulate that awareness and respect of students' backgrounds are one important characteristic of good educators (Ben-Peretz 2001; Bullock and Firmstone 2008; AoME 2011; HEA 2011; Mondal and Roy 2013). This implies that cultural competence is fundamental for effective teaching and essential for all educators. Consequently, several recommendations for integrating cultural competence into educational practice have been proposed (Ladson-Billings 1995; Parrish and Linder-VanBerschot 2010); for example:

➢ A combination of constructivist (active) and didactic (passive) learning may be beneficial, as both methods can complement each other.
➢ Educators need to maintain positive relationships with students.
➢ Cultural issues need to be communicated with students in order to reduce potential cultural biases.
➢ Support for developing and integrating cultural competence into professional education and teacher training needs more consideration.

In conclusion, cultures provide significant influences on teaching and learning in general and specifically on dental education. Educators need to develop cultural competence in order to provide culturally-relevant education which respects students' cultural backgrounds and helps students achieve academic success.

Chapter 6 Research Methodology, Method, and Processes

This chapter presents how this research project was proposed and conducted. The chapter comprises of nine sections: research philosophy, selected methodology and method, the Delphi method, pilot study, main study, data analysis and interpretation, a curriculum for educators (educator-curriculum) and data verification, quality of the research, and research ethics.

6.1 Research Philosophy

This first section presents the philosophical position which informed the method used in this research. There are two subtopics in this section: research paradigm and roles of the researcher.

6.1.1 Research Paradigm

"A paradigm is a basic set of beliefs that guide action. Paradigms deal with first principles, or ultimates. They are human constructions" (Denzin and Lincoln 2005, p. 183).

A paradigm provides basic concepts of the world and reality, and it influences how a researcher interacts with the reality and how reality is understood (Guba and Lincoln 2005). A paradigm shapes the research framework and shapes a researcher's understanding of phenomena. There are a number of paradigms which can explain the nature of research; however, the main paradigms which compete in the medical and dental education arenas are: positivism, constructionism, and critical theory (Bunniss and Kelly 2010).

6.1.1.1 Positivism

Positivists believe that reality already exists in the world regardless of context and time (Bunniss and Kelly 2010). The role of the positivist researcher is to objectively observe reality in a natural setting (i.e. a value-free approach) and control all factors which can influence reality (Illing 2010). Accordingly, a deductive methodology – mainly quantitative – and methodological rigour (including the validity, reliability and objectivity of research) are essential for a positivist study (Guba and Lincoln 2005).

From the positivist position, it would be possible to identify universal 'truths' about components of dental education (e.g. curricula and educational strategies), independent of local contexts. An educator-curriculum could be applied across European countries regardless of any external or local factors. Positivists would hold that it is possible, theoretically, for a researcher to test the validity and generalisability of a proposed curriculum. In such research, issues such as sample size, objectivity and biases need comprehensive consideration. A positivist paradigm provides several potential advantages related to this study. They include: negligible or limited bias and external influences in curriculum identification; and reproducible and generalisable results which can be applied in different European contexts.

However, positivism also introduces a critical disadvantage to this study. Socio-cultural issues and human factors can influence teaching, learning and education (Hofstede 2011). When studying dental education and relevant issues (including curriculum), these factors need to be considered. However, positivism would seek to hold constant both contexts and human factors; therefore researchers adopting this approach might not be able to fully explain how the curriculum ought to apply in a specific country or context. Therefore, I argue that adopting a positivist approach would only lead to identification of 'ideal' curriculum content instead of a 'practical' curriculum.

The 'ideal' curriculum may not be fully applicable across Europe, due to the continent's divergent cultures.

6.1.1.2 Constructionism

Constructionists believe that reality is relative and depends upon contexts, human interpretations and constructions (Guba and Lincoln 2005). In this paradigm, the role of the researcher is a relativist who investigates reality on the basis of human interpretation from a context-specific viewpoint, who places emphasis on interpretation, and who constructs an understanding of reality (Illing 2010). Hence, inductive (qualitative) approaches are essential for a constructionist paradigm (Jackson and Verberg 2007).

From the constructionist viewpoint, there is no component of dental education which is universally true. In other words, dental education is relative and depends on context. For instance, teaching strategies for any particular topic are varied to suit the nature of students, educational environments, and learning support resources. Curriculum content is interpreted differently in different contexts.

The advantage of utilising a constructionist approach in this study is that it is possible to explore context-specific areas and discover new information (e.g. how students' backgrounds influence the way educators provide feedback to support students' learning). This can be achieved by utilising qualitative tools such as in-depth interviews or focus groups, which are effective methods for gathering rich data on a specific issue and its surrounding contexts (Hoepfl 1997; Edmunds and Brown 2012). In addition, analytic approaches such as discourse analysis – which can provide detailed information about contexts, cultural backgrounds and powers by analysing the use of language (Hodges et al. 2008) – could be beneficial in gaining a broad understanding of local

and political factors which influence the curriculum content for dental educators.

However, the main disadvantage of qualitative approaches is that it is difficult to generalise results (Illing 2010). Identified curriculum content might be applicable in only one specific European area due to several limitations (e.g. non-representativeness of participants). Therefore, it can be concluded that although a constructionist approach would provide 'practical' local curriculum content, it would be difficult to further deduce recommendations for all European contexts.

6.1.1.3 Critical Theory

With critical theory, it is thought that reality is processed and transformed from time to time by human and other factors. Reality is then crystallised into an insight which can be generalised in particular settings (Guba and Lincoln 2005). A researcher can be either realist or relativist, depending on their understanding of the nature of reality; however, it is suggested that the researcher needs to be aware that the values of the researcher (and other people within the research context) can inevitably influence the inquiry (Illing 2010). Both quantitative and qualitative enquiries can be utilised to comprehend the reality explored (Bunniss and Kelly 2010).

Regarding the critical theory perspective, dental education can be seen as a reality which is continuously shaped by external influence, human interpretation and time. It is then transformed into a general reality which is mutually accepted and can be applied in different contexts. An example for this argument is that in the past dental education in Europe was mainly aimed at developing a list of subjects that needed to be taught within an UG-curriculum in order to provide dentists with the necessary skills for dental practise (Bánóczy 1999). After the beginning of the Bologna Process, dental

education has been progressively developed; now it covers many areas of educational structures (e.g. students, UG-curriculum, quality assurance) (Oliver and Sanz 2007). 'Dental education' has been shaped over time by many factors such as the development of dental sciences, EU policy, the Bologna Process, and oral health needs. Therefore, in my view, critical theory represents an appropriate philosophical paradigm for understanding the nature of dental education.

As for 'dental educators' and 'curriculum' they are, undoubtedly, a part of dental education, so they must also be influenced by similar factors which shape dental education. However, as we have seen, there are problems in defining 'dental educators' (see Chapter 2), and possibly also for defining 'curriculum.' Although there is a lack of literature on developing an educator-curriculum, many studies suggest similar areas in which educators, in general, need to be competent in (see Chapter 3 and 4). It could be assumed that there must be common curriculum content which could be applied across Europe. It would comprise several shared educational elements (e.g. principles of teaching and learning, student assessment, etc.) which could be identified using different research approaches. However, the curriculum identified by different methods may not contain the same content as a result of local and uniquely European trends of dental education, at a given time. Thus, it would seem appropriate to explore the nature of an educator-curriculum by utilising the critical theory paradigm. The summary of the discussed research paradigms is illustrated in the Table 6.1.

Table 6.1 Key issues of the three major research paradigms and their views on dental education and curriculum.

Paradigm	Positivism	Constructionism	Critical Theory
Basic Beliefs	➢ Absolute reality ➢ Objectivity ➢ Value-free ➢ Verification / Falsification ➢ Deductive methodology	➢ Relative reality ➢ Subjectivity ➢ Value-dependent ➢ Interpretation / Understanding ➢ Inductive methodology	➢ Shaped reality ➢ Objectivity or Subjectivity ➢ Value-mediated ➢ Critique / Transformation ➢ Mixed methodology
Dental Education	➢ Universal definition ➢ Context-independent	➢ Relative definition ➢ Context-dependent	➢ Shaped / Transformed definition ➢ Influenced by contexts
Curriculum	➢ Single model ➢ Applicable across contexts	➢ No single model ➢ Applicable only in a specific context	➢ Partially applicable across contexts ➢ Partially applicable only in a specific context

To put it succinctly, from the philosophical point of view, I believe that an ideal educator-curriculum exists and it is identifiable; however, it is transformed by external influences from time to time. To understand this phenomenon, (1) core curriculum content which is applicable across Europe needs to be identified, (2) context-dependent content which is influenced by external factors also need to be explored, and (3) factors which impact on the curriculum need to be understood, critiqued, and interpreted in order to provide adequate information when creating the curriculum. To achieve this, I judged it fitting to adopt a critical theory approach for this research project.

6.1.2 Roles of the Researcher

There are two common approaches for a researcher to interact with a phenomenon in order to understand the reality – realist and relativist (Guba and Lincoln 2005). I believe that it is possible to identify the core curriculum by using a scientific approach because the shared core content which is expected to be generally applicable across Europe could be perceived as an absolute reality. Given this understanding, the researcher needs to be a realist who observes the curriculum within a controlled environment. However, it is impossible to control the external factors (e.g. politics) as they are beyond the control of the researcher. Moreover, as they are the key factors shaping and transforming the curriculum continuously, they should not be disregarded. In other words, the curriculum needs to be identified in a real context which is shaped and affected by these factors. The role of the researcher in identifying the curriculum needs to include: investigating the curriculum in real contexts, exploring and understanding the external factors which impact on the curriculum and interpreting the relationship between the curriculum and external factors. Consequently, the researcher also needs to be a relativist. However, the role as a realist may be also helpful for observing the curriculum a portion of the curriculum which is not influenced by contexts.

In this research project, I chose the role of the relativist who identifies curriculum content and understands and interprets external factors in real contexts. Additionally, I played the role of realist to investigate context-independent issues.

6.2 Selected Methodology and Method

6.2.1 Research Approaches for the Critical Theorist

I believe that although the whole educator-curriculum is a 'shaped reality', the core content can be perceived as universal (i.e. the content can be applied in

different countries throughout Europe). For instance, although clinical contexts may be different among European countries, experience in clinical practice is still essential for educators to be able to teach students in clinical contexts. This implies that competence in 'teaching clinical dentistry' is fundamental for dental educators and can be perceived as a core content of the educator-curriculum. In this case, contexts and external factors would not serve as influences on the core curriculum; thus, quantitative methodology can be used to capture the core content.

Quantitative methodology has been acknowledged in the literature as able to separate or control values, biases and external influences, provide logical and justifiable results, and produce valid conclusions (Lather 2004; Hammersley 2006). However, the quantitative approach (within a positivist paradigm) cannot explain many situations which involve human nature yet (Hammersley 2006). Using a quantitative approach may not be able to fully explain the different perceptions which people have of the curriculum and dental education. However, from the researcher's viewpoint, this approach may be useful in identifying the core curriculum content, which is independent from the context.

Qualitative approaches can produce deep understandings and explore new perspectives in context-specific settings (Hoepfl 1997), and could provide an alternative solution for understanding, exploring and interpreting the context in which the curriculum is set. According to the previous example, while a quantitative approach helps identifying 'teaching clinical dentistry' as core content, a qualitative approach enables a researcher to understand 'why' it is important and 'how' to teach clinical dentistry in different European contexts. A small number of academics (Lather 2004; Hammersley 2006) encourage educational researchers in the use of qualitative approaches in educational research because they can explore in-depth information and context of a study which the scientific approach cannot do. Qualitative approaches also

provide information from different aspects which could be used to support judgement for any research that is used at the policy-making level. In my opinion, their arguments on the benefits that the qualitative research can give to a study are valid. However, I do not think that only adopting the qualitative approach would provide all the information which would enable the identification of an agreed educator-curriculum. However, a qualitative approach gives recognition to contexts and human factors.

On balance, I believe that both quantitative and qualitative methodologies are important in different aspects. Educational academics (Lather 2004; Lauder et al. 2004) urge the need for integrating the qualitative approach into the traditional positivist approaches. It is asserted that the positivist approach provides empirical data of social (educational) problems while constructionist methods can explain the underlying reason for the problems. From the above discussion, both methodologies have their own strengths and weaknesses. A mixed approach enables the strengths of one approach to complement the limitations of another. While quantitative data tries to capture reality, qualitative data can be used to help to explain and understand the contexts and other factors which influence the reality (Creswell and Clark 2007). A methodology which contains mixed approaches is congruent with the critical theory position of this research project.

6.2.2 Methodology for Identifying Curriculum Content

For curriculum development, there are many methodologies which can be used to gather information from the target group (Kern et al. 2009). However, two methodologies which are generally applied for this purpose are case study using interviews (individual or group) and consensus methodology.

A case study is defined as "*the detailed examination of a single sample of a class of phenomena*" (Flyvbjerg 2006). Its advantages over other

methodologies are: it focuses on understanding perceptions and experiences of specific individuals or groups, and it provides in-depth information about target groups in particular contexts and times. In-depth interview is a common tool used in a case-study research. It is suggested that interviews can provide comprehensive information of a particular issue from specific participants and they can be used to explore underlying factors which influence an individual's learning needs (McClelland 1994). They also provide rich information, not mentioned in the literature, even if there are few participants in the study (Wall and McAleer 2000). The interview can be an effective tool for exploring and understanding a curriculum.

Consensus methodology aims to identify agreement, expand agreement, and adjust disagreement in particular issues by using a group of people who have insight, knowledge, or experience which are relevant to the issues (Fink et al. 1984). Consensus methodology is appropriate when dealing with diverging or controversial issues, and it provides a collective agreement based on knowledge, experience, and evidence (Jones and Hunter 1995). It allows the use of mixed methods to gather data (Rowe and Wright 1999; Powell 2003). Disagreement in the consensus methodology might indicate issues which require further study. Turner and Weiner (2002) explain that people from different backgrounds provide diverse opinions which can compromise the consensus. On the other hand, disagreement could be beneficial as it reflects the fact that personal background, culture, and local context produce influences on personal judgement, so there may possibly be issues which need further exploration. It was found that experience and culture have strong influence on human attitudes and behaviours (Hofstede 2011).

Consensus methodology can be used in many purposes, such as: designing an educational programme (Powell 2003) and developing policies (Bloor et al. 2013). However, there are several issues which may decrease the quality of the results and require consideration when using consensus methodology

(Fink et al. 1984; Jones and Hunter 1995). For example, bias from sampling techniques, participants and the researcher may arise because of the human factors (e.g. attitude and opinion) involved in the data collection process, and the weaknesses from a low degree of consensus (low numbers of respondents) which cannot produce defensible results, can occur. For these reasons, a well-designed data collection process is required.

As this research aims to identify agreed curriculum content, consensus methodology is appropriate and introduces several benefits to the study. It helps in transforming diverged opinions of participants into a common understanding or agreement. Both quantitative and qualitative information can be obtained by using consensus methodology which enables the use of mixed methods (Keeney et al. 2011). It is possible to utilise a data collection tool to gather participants' opinion by using both measures; for example: rating scales to identify the degree of agreement on a particular issue, and exploratory open questions which allow participants to provide comment on the issue or to explain their viewpoint.

6.2.3 The Consensus Methodology and Its Methods

Although a number of methods within consensus methodology has been established and used in several previous studies, the two techniques generally used are the nominal group techniques and the Delphi method (Fink et al. 1984; Jones and Hunter 1995). The nominal group technique is a structured meeting which is used to gather qualitative information from people who provide an insight into a specific area of the discussion. It aims to identify and prioritise understanding in both subjective and objective aspects to support personal judgement and group consensus. The strengths of the nominal group technique are that issues are clarified by group discussion processes, and that influences from other group members are limited by allowing individuals to make their own judgments (Van de Ven and Delbecq 1972). However, this technique has weaknesses of which researchers need

to be cautious, they include: the demands of the structured meeting which requires high willingnessa and effort from both researchers and participants, and in order to support group activities a highly-skilled group facilitator is required (Gallagher et al. 1993).

The Delphi method is a process of obtaining expert opinion to develop consensus in particular issues by using iteration of questionnaires and feedback without any formal meeting (Powell 2003). The major benefits of this method are that it can be used to identify human opinions to support an area where there is a lack of evidence or information (Campbell and Cantrill 2001); it adds understanding to an area which has yet to be completely discovered (Staykova 2012); and it is an effective tool for gathering opinions from people with different backgrounds (McLeod et al. 2003).

The strengths of Delphi method have been reported in the literature (Van Dijk 1990; Williams and Webb 1994; Powell 2003; Bloor et al. 2013). Participants can express their opinion without influences from external factors. Feedback in the data collection process can widen knowledge and ideas so as to support individual judgement. It combines both quantitative and qualitative methods to gather information from participants. Because a formal meeting is not required, it can be used to obtain information from people who live in different places – regardless of geographic barriers.

However, the Delphi method also has weaknesses which need consideration (Keeney et al. 2001; Powell 2003; Keeney et al. 2011; Bloor et al. 2013). It requires the time and commitment of participants to involve themselves in the process. Because there is no formal meeting set up for group discussion, some issues may not be properly clarified. The more Delphi rounds are conducted, the lower the received response rate. The items that reach agreement tend to be bland and non-controversial. There is no specific

guideline for utilising the Delphi method; therefore the trustworthiness and accuracy of the results may vary depending on study contexts.

Regarding the purpose of this research study, the Delphi method was more practical than the nominal group technique because it can be used to approach participants in different countries without any problems arising from geographic and language barriers. Although it may not allow face to face discussion, it is possible to utilise a questionnaire which contains open-ended questions which allow participants to express their opinion and raise any issues which concern them. Moreover, due to the iterative nature of the Delphi method, items are open for further discussion between the Delphi rounds. This strategy can improve the clarification of any issue arisen during the Delphi process and improve the quality of the results (Black et al. 1999).

In this research project, based on the critical theory paradigm, it was believed that an educator-curriculum would comprise of both core content and context-dependent content; hence, I judged that the Delphi method was an appropriate method for identifying the curriculum content and it was used as the main data collection tool in this research project. My research approach is summarised in the Table 6.2.

Table 6.2 The research paradigm, methodology, and method.

Paradigm	Critical Theory Ideal Curriculum → Agreed Curriculum ← External Factors, Human Factors, Politics and Cultures
Role of the Researcher	Relativist and Realist
Methodology	Consensus Methodology
Method	Delphi Method
Data	Quantitative: Rating Scales Qualitative: Open-Ended Questions

6.3 The Delphi Method

6.3.1 The Experts and Panel Members

Although there is no exact definition of 'experts' in the Delphi method, it has been suggested that experts should be qualified people who are experts in a particular area, are representatives in the specific discipline, or who have experience in the certain topic, and who are willing to contribute their information to the study (Jones and Hunter 1995; Keeney et al. 2011). However, Turner and Weiner (2002) argue that people who have knowledge and experience may not necessarily be experts. The authors raise the point that people who are willing to participate in the study may not necessarily be people who have important information, but may instead be people who will receive benefits from the study result.

The panellists in the Delphi study should be heterogeneous (i.e. a mixture of participants) in order to gather information from various viewpoints and reduce the random variation of panel behaviours rather than homogeneous (i.e. panellists who have a similar background and experience) (Jones and Hunter 1995; Bloor et al. 2013). In other words, the panel should consist of qualified people (i.e. experts) and people from external bodies such as policy makers (i.e. non-experts) (Keeney et al. 2011). For curriculum planning, Keeney et al. (2001) suggest that educators, students, and other stakeholders should be included in the panel. However, Kilroy and Driscoll (2006), in contrast, recommend that students should not become involved in the consensus development process because they are not yet qualified. This infers that students lack the knowledge and experience required to provide an effective contribution to the Delphi study. Conversely, it can be argued that although students may not have knowledge and experience in education, they are the main group of people involved in most components of an UG-curriculum (e.g. learning activities, assessment). Their experience, thus, offers a valuable contribution to a Delphi study.

The experts in this research study were defined as (1) dental educators who are mainly engaged in UG-DentalEduc (which ensures that they have relevant information to the study) and who are involved in any European dental education professional body (which ensures that they take an active interest in dental education), and (2) dental students who are involved in any European dental student association (which ensures that they are interested in dental education). This study included dental students in order to broaden the spread of ideas and improve the quality of the results.

6.3.3 Target Population, Sampling, Samples, and Access

The target population in this study consisted of two groups of people.

(1) The experts in dental education from European countries who are involved in and who contribute to any European dental education organisation; and

(2) The dental student representatives who are currently studying in an UG-curriculum in any European country.

There are two sampling techniques which have generally been used previously to select panellists – random sampling and purposive sampling. Random sampling is a process where samples have an equal chance to be selected to participate in the study (Jackson and Verberg 2007). Purposive sampling is a process that selects samples of individuals who possess specific knowledge and experience for the study (Hasson et al. 2000). Random sampling has been claimed to provide a high representativeness of the panellists (Clayton 1997); however, few Delphi studies have used this sampling technique (Broomfield and Humphris 2001; Irvine 2005). Because samples that have relevant knowledge and experience may not be selected by the random selection technique, some important information from those samples may be lost. Therefore, purposive sampling has been chosen by several studies to select desirable panellists (Macdonald et al. 2000; McLeod et al. 2003; Lightfoot et al. 2005a, b). Although purposive sampling may not be able to assure the representativeness of the panellists, this problem can be resolved by using heterogeneous panellists who can provide a wide range of information from different backgrounds and understanding (Jones and Hunter 1995).

This research project utilised heterogeneous panellists (i.e. educators and students) and purposive sampling was employed to select panellists who

have relevant knowledge and experience. The inclusion criteria for selecting the panellists are presented in the Table 6.3.

Table 6.3 The inclusion criteria used for selecting the panellists.

Panel	Criteria
Educator Panellists	➢ They should be qualified dentists; ➢ They should have an educational qualification or have teaching experience in any undergraduate dental curriculum for at least two years; and, ➢ They should have involvement or contribution in any European dental education organisation
Student Panellists	➢ They should be studying in a European undergraduate dental curriculum; and, ➢ They should be student representatives, or have involvement or contribution in any European dental student organisation

It is suggested that the panellists should be accessed, selected, and contacted via a professional body where experts usually join and meet together (Keeney et al. 2011). In this study, panellists were accessed via professional bodies. The educator panel was accessed via the Association for Dental Education in Europe (ADEE), while the student panel was accessed through the European Dental Students Association (EDSA).

A specific number of panellists to be used in a Delphi study has not been stated in any previous study. The appropriate panel size can range from five

people to hundreds of people (Delbecq et al. 1986; Clayton 1997; Keeney et al. 2011). It is suggested that the panel size is dependent on the study's purpose and scope (Powell 2003) and should demonstrate the heterogeneity and representativeness of the study (Keeney et al. 2001). Statistically, the minimum number of samples needs to be at least 30 in order to provide rigour for statistical analysis (Whitley and Ball 2002). However, de Villiers et al. (2005) assert that a panel size which is greater than 30 may not improve the quality of the Delphi result. On balance, the expected panel size in this study was 60 panellists: 30 dental educators and 30 UG dental students, from different European countries. The panellists consisted of both males and females from any age range.

One might argue that these numbers are relatively low relative to the total number of countries and dental schools in Europe. I acknowledge this issue as a potential limitation of this study. However, inclusion criteria, the heterogeneous panellists, and expertise and experience of the panellists were expected to provide rich data and improve the quality and trustworthiness of the study results.

6.3.4 Type of Delphi

There are two types of Delphi method which can be used to gather information from panellists: postal (conventional) and electronic Delphi (Keeney et al. 2011). Compared to a postal survey, using an e-survey can provide either a lower, similar, or higher response rate (Edwards et al. 2009), but can gain quicker and more complete responses from respondents (Truell et al. 2002; Kaplowitz et al. 2004). It was also found that the use of e-Delphi can reduce the time and cost of data collection and can be used effectively in an international study (de Villiers et al. 2005). However, the main disadvantage of e-Delphi is that panellists must have adequate IT skills and be able to access the internet, otherwise the response rate may be low due

to technical difficulties (Keeney et al. 2011). This problem can be overcome by providing clear information and instruction to all panellists.

This research study employed e-Delphi as a data collection tool. The questionnaire was developed using the Bristol Online Surveys (BOS) system.

6.3.5 The First Round Delphi

The main characteristic of the Delphi method is the iteration of the data collection process (which is called the 'Delphi round'). The iteration will stop when consensus is achieved among panellists. There are several contentious issues in the characteristics and use of the first round Delphi. Previous studies found that the first round can use either qualitative methods which aim to generate ideas and gather broad information, or utilise quantitative methods which allow panellists to make decisions based on pre-existing data (Rowe and Wright 1999; Keeney et al. 2001). The qualitative process allows panellists to develop ideas from their knowledge and experience which may directly relate to their needs and expectations, and also to gain panellists' motivation and develop a positive relationship between panellists and the study (Van Dijk 1990). This can be used to maintain a decent response rate and the trustworthiness of the study. However, qualitative methods may also be proved to have a negative impact on a study. A subsequent round could be established because panellists are not allowed to provide, judge, or make a decision in the first round. However, they may feel fatigued and refuse to participate in the additional subsequent rounds. Because of this, the response rate may decrease.

In contrast, the first quantitative round could be advantageous to this study. It can reduce the need for subsequent rounds in order to prevent fatigue and a subsequent lower response rate (Keeney et al. 2001). Researcher biases in the qualitative data analysis will be eliminated (Kilroy and Driscoll 2006);

although, researcher biases might help in condensing data for further quantitative rounds. A questionnaire constructed based on the previous literature will provide more validity, because information from the previous literature has been reviewed, adjusted, and updated continuously (Turner and Weiner 2002; Alahlafi and Burge 2005; Clayton et al. 2006). However, it has been argued elsewhere that using pre-existing information may limit the panellists from providing their complete opinion and introduce bias from the researcher through psychological anchoring, in that only those items which the researcher judges relate to the study are included (Hasson et al. 2000).

The critical element of the Delphi study is the trustworthiness of the result, therefore using a quantitative first round which reduces the subsequent round count and maintains the response rate, was judged to be preferable. In addition, the problems of quantitative methods can be compensated for by providing open-ended questions in the questionnaire which allow the panellists to express additional ideas and insights.

The first Delphi round in this study utilised a quantitative questionnaire which was developed from the literature. Open-ended questions were also used in order to gather qualitative data from the panellists. The quantitative part supported the first and second objectives of this research (i.e. [1] to identify the core content of a curriculum for developing educators of dental UG students in Europe and [2] To identify context-specific content of the curriculum which is informed by external factors and local contexts) while the qualitative section supported the second and third objectives (i.e. [3] to identify factors which influence the curriculum content and need consideration when developing the curriculum).

6.3.6 The Subsequent Rounds

The main purposes of subsequent rounds are to develop individual opinions into a group consensus, and to allow panellists to re-consider and compare their previous opinions with the group result in order to make new decisions or provide rationales to defend their opinions (Delbecq et al. 1986). Although the iteration of questionnaire and feedback can improve the acceptance of consensus (Hasson et al. 2000; Keeney et al. 2001), the response rate will decrease in every subsequent round due to fatigue and disinterest of the panellists (Stitt-Gohdes and Crews 2004). There is no exact recommendation for how many subsequent rounds should be conducted. The Delphi round can be conducted for two or three rounds (Campbell and Cantrill 2001), or until consensus is achieved (Keeney et al. 2011), or until the response rate is too low (Hasson et al. 2000).

This research study was expected to conduct two subsequent rounds (i.e. the second and the third rounds) in order to assure that a majority or complete consensus could be achieved, that the panellists would not be too fatigued, and that the response rate would not be too low.

6.3.7 Response Rate

An important factor which determines the quality of the study as discussed is the response rate. It is suggested that the response rate of each Delphi round should not fall below 70% so as to maintain the rigour of consensus (Kilroy and Driscoll 2006). The response rate of studies using a questionnaire as a research tool varied from 50% to 90% (Dolan and Lauer 2001; McLeod et al. 2003; Clayton et al. 2006). One report claimed that there was no significant difference between the results of each Delphi round; although, the response rate was low (66%) (Mash et al. 2006). However, a high response rate could ensure the validity and reliability of the study result (Hill and Fowles 1975; Campbell and Cantrill 2001). This implies that it is necessary to

define a level of response rate which would maintain the quality of the study; despite the exact level of response rate has yet been reported in the literature.

In this research project, the minimal level of response rate was arbitrarily set as 70% in order to ensure rigour of the study results but still be practical (i.e. not too high to achieve). No additional subsequent round would be launched if the response rate of the previous round fell below 70%.

For e-Delphi, the range of response rates in several studies were from 50% to 75% (Clayton et al. 2006; Hand 2006). Although no study reported a relationship between study results and the response rate, several studies suggest two strategies which help increase the response rate (Stone 1993; Kwak and Radler 2002; Kaplowitz et al. 2004). Firstly, there needs to be follow-up contact reminders after each questionnaire is distributed. This process could increase the response rate approximately 25-30% (Cook et al. 2000); however, excessive reminders may also reduce the response rate as they could alienate participants. Secondly, offering an incentive to participants can gain their interest toward the study and improve the response rate. However, some participants might assume that the incentive relates to a complicated or long questionnaire, so they may not be eager to complete the questionnaire, which could lead to a decrease in the response rate.

In this study, in order to raise the response rate, a reminder was sent to all non-respondents twice (in weeks 3 and 4 after the questionnaire was sent) for each Delphi round. No incentive was offered for completing the questionnaire.

6.3.8 The Feedback Report

Controlled feedback is one important characteristic of the Delphi method. The benefits of feedback are that it provides panellists with the result and trend of group opinion, and that it allows each panellist to compare their individual opinion with the group opinion so that they can make new decisions which can lead to group agreement (Hasson et al. 2000; Campbell and Cantrill 2001). In contrast, Rowe and Wright (1999) argue that because the Delphi study does not allow panellists to discuss any issue during the process, the advantages of feedback can decrease due to the loss of explanation. However, the feedback can demonstrate quantitative results concurrently with qualitative information and literature support, and could compensate the disadvantage of the absence of discussion (Okoli and Pawlowski 2004). This can help panellists understand the underlying rationale of the group result.

Therefore, the feedback report for the first Delphi round provided quantitative figures (group result), responses in the first round (each respondent could see their own rating), and qualitative quotations in order to maximise the efficiency of feedback.

6.3.9 The Final Report

Consensus is a collective opinion, thus, it cannot be defined as the best answer for a specific issue (Clayton 1997). The main purpose of the final report is to present trends and the agreement of experts' decision toward the issues, along with the support of the relevant literature. It allows readers to judge the quality and acceptability of consensus (Keeney et al. 2001). In addition, both consensus and non-consensus items should be thoroughly presented and discussed (Powell 2003). Therefore, the final report of this research study presented the final consensus and non-consensus items (with statistical figures), the summarised result of each Delphi round, and the qualitative quotations for both consensus and non-consensus items.

6.3.10 The Delphi Questionnaire Development

The development of the Delphi questionnaire comprised of several processes: literature search, selection of the literature, and a thematic data analysis of the literature (Figure 6.1). Literature was retrieved from both medical (including dental) and social sciences databases. Seventeen articles were selected and analysed. Thematic data analysis was utilised for data coding, categorising, and developing emerged themes and subthemes from the analysed information.

Figure 6.1 The Delphi questionnaire development process.
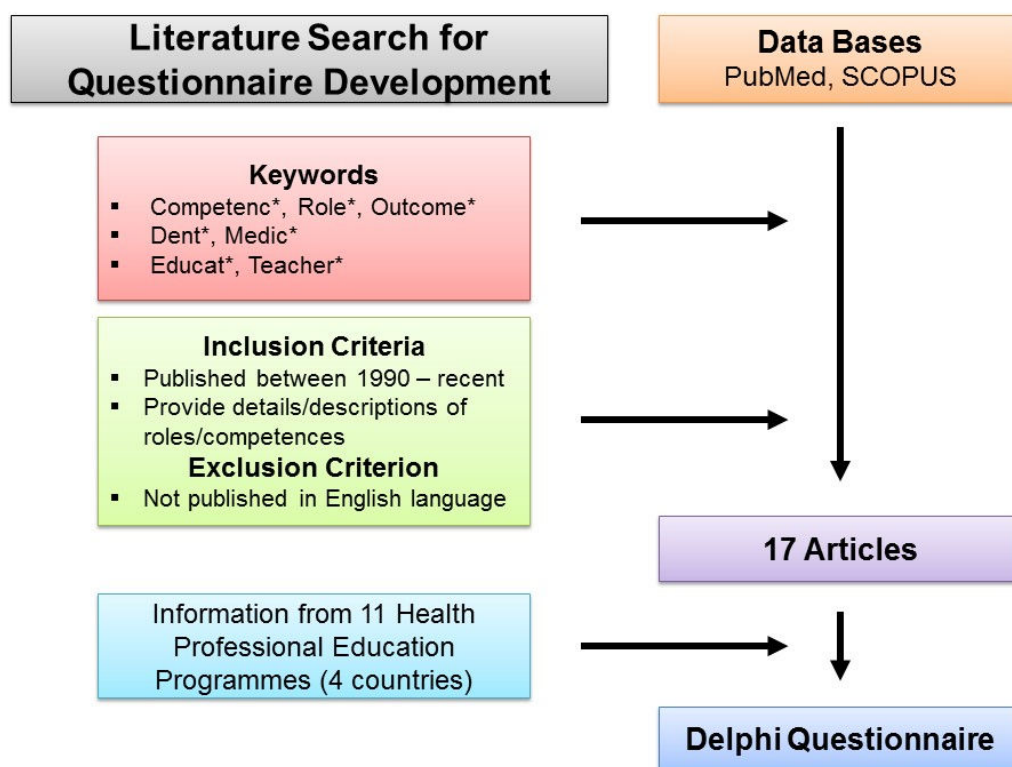
Six articles were initially analysed thematically to develop codes, themes, and sub-themes as a framework for further analysis (Appendix A). These six articles were primarily selected because they contained detailed information/discussion relating to the roles and competences of dental

educators. These were used to develop a qualitative analytical framework. Then the other 11 articles (which contained less detailed information/discussion) were analysed using the framework." All analysed data were re-categorised; the result of the data analysis was educational content for which dental educators should demonstrate competence. The educational content was classified into 12 topics (Table 6.4).

Table 6.1 Twelve topics emerged from the literature analysis.

12 Topics of Delphi Questionnaire

Topic	References
1. Educational Theories and Principles	1. Irby (1994)
2. Modes of Education	2. Harden and Crosby (2000)
3. Learner's Issues	3. Prideaux et al. (2000)
4. Educational Materials	4. Hesketh et al. (2001)
5. Assessment and Feedback	5. SREB (2002)
6. Curriculum	6. McLeod et al. (2003)
7. Evaluation	7. NLN (2005)
8. Educational Research	8. Hand (2006)
9. Educational Management	9. Harris et al. (2007)
10. Quality Assurance	10. Bullock and Firmstone (2008)
11. Patient Care and Health Care System	11. Bligh and Brice (2009)
12. Professionalism	12. Molenaar et al. (2009)
	13. AoME (2010)
	14. AoME (2011)
	15. HEA (2011)
	16. Srinivasan et al. (2011)
	17. London Deanery (2012)

In order to improve the quality and trustworthiness of the questionnaire, information of health professional education programmes from 11 institutions in the UK, Europe, and Australia were used and analysed to triangulate the themes developed from the literature (Table 6.5). The programme structure and contents were accessed via each institution's website.

Table 6.5 Use of information from health professional education programmes to triangulate themes developed from the literature.

University	Educational Theories and Principles	Modes of Education	Learner's Issues	Educational Materials and Instructional Design	Assessment and Feedback	Curriculum	Evaluation	Educational Research	Educational Management	Quality Assurance	Patient Care and Healthcare System	Educational Professionalism
Anglia Ruskin University, UK	C	C	P	C	C	C	P	C	P	X	P	P
Cardiff University, UK	C	C	C	C	C	P	C	C	X	X	X	P
University of Dundee, UK	C	C	C	C	C	C	C	C	P	C	X	C
Durham University, UK	C	C	X	C	C	X	X	C	C	X	C	C
University of Manchester, UK	C	C	C	C	C	C	P	C	C	X	X	C
University of Nottingham, UK	C	C	P	C	C	X	X	C	X	P	X	P
Royal College of Physicians, UK	C	C	C	C	C	C	P	C	P	X	X	P
University of Warwick, UK	C	C	C	C	C	C	C	C	P	P	P	P
Korolinska Institute, Sweden	C	C	C	C	C	P	P	C	P	X	C	C
Maastritcht University, Netherlands	C	C	P	C	C	C	C	C	C	C	C	X
University of New England, Australia	C	C	P	C	C	C	C	C	P	X	C	C

C = The module's content covers at least half of the sub-themes within the theme.
P = The module's content covers less than half of the sub-themes within the theme.
X = No educational content in this theme is available in any module of the programme.

The literature analysis provided a list of educational content in which dental educators should be competent (see Chapter 3). However, the result from the triangulation showed that only the topics which relate to basic components of education (e.g. educational principles, assessment) and educational research are available in all educational programmes. An educational programme may not be able to deliver all educational content suggested by the literature due to several factors such as limited curriculum period and resources. Hence, only educational content or topics which are relevant to the educational goal and target customers of the programmes would be chosen and delivered. The result also confirms that most educational programmes consist of both core content and context-specific content which fit with the critical theory.

Regarding the aim of this research project, the result should provide essential information which covers all areas of dental education in order to help European universities who wish to develop their own training programmes for dental educators, for the benefit of staff and students. Therefore, all educational content emerging from the literature was used to develop the first round Delphi questionnaire.

6.3.11 The Questionnaire's Structure

The questionnaire consisted of four sections: instruction, consent form, the main questions, and demographic data (Appendix B). The instructions provided the research aim, the structure of the questionnaire, and guidance for completing the questionnaire. The consent form addressed relevant ethical issues of the study and requested the participant's consent. The general information of the panellist (e.g. age, qualification, roles) was asked for in the demographic data section.

The main questions were separated into two parts: quantitative and qualitative parts. The quantitative part employed a four-point Likert scale (i.e. 1= not necessary, 2 = optional, 3 = desirable, and 4 = essential). The panellists were asked to rate their opinion of the pre-defined curriculum content for dental educators, which was grouped into similar topics. Further details of each item of educational content were provided in the 'More Info' button (Appendix D). An open-ended question was provided at the end of each topic in order to allow the panellists to provide information to support their rating and to provide suggestions for adding, deleting, or adjusting each item in the list.

6.3.12 Rating Scale Critiques

Rating scales can be either an odd or even number of responses. It is sometimes suggested that rating scales need to comprise an even number to eliminate the neutral response. Garland (1991) concluded that a four-scale rating allows respondents to give their definite opinion without reluctance. However, if a question is poorly developed or the respondents do not clearly understand a question, forcing respondents to answer either positively or negatively can distort the result and reduce the validity of study results (Rattray and Jones 2007). Additionally, it is important to acknowledge that some respondents may be indecisive on a particular issue, therefore a neutral answer is required (Murray 1999). This means that five-scale rating may produce a valid result if the questionnaire is well-developed. Hence, good questionnaire development is the key issue for selecting and using rating scale.

For a Delphi study, there is no rule to utilise a specific type of rating scale and there is lack of studies reporting on the effect of the rating scales on study results. It can be implied that selecting a rating scale is quite arbitrary and that using different rating scales may not provide any significant dissimilarity to the study result. This research project intended to identify

opinions and agreements toward educational content which should be or not be included in an educator-curriculum; the rating scale therefore ought to clearly distinguish between important and unimportant items. Consequently, the four-scale rating was chosen to be employed in the Delphi questionnaires.

6.3.13 Questionnaire Validation

Before the questionnaire was piloted, it was sent to two educational experts to improve the clarity, content validity and construct validity. One educational expert was a dentist who possessed a Masters degree in medical education, with English as their first language. Another educational expert was a university lecturer who possessed a doctoral degree in education, but English was not their first language. As a result, the first educational expert could give feedback on the content which related to the dental perspective and the use of English language; while the second educational expert could provide suggestions on educational aspects and comments on clarity of the language used in the questionnaires. From their feedback, only the writing style and the questionnaire's format needed amendment.

6.4 A Pilot Study

6.4.1 Aims

A pilot study is a beneficial element prior to the main study (van Teijlingen and Hundley 2001; Thabane et al. 2010) and is deployed to identify inappropriateness or potential problems of a study, methodology, and instruments to collect preliminary data, to develop the researcher's skills which are necessary for conducting the study, and to enhance the internal validity of a questionnaire by using participants' feedback to identify ambiguities in the questionnaire. A pilot study may also increase the feasibility of research administration by reducing unnecessary processes and resources in the study (Keeney et al. 2001). Using a pilot study could

improve the construct validity by allowing respondents to verify the appropriateness of a questionnaire before being used in the first round (Okoli and Pawlowski 2004). In light of the above, I conducted a pilot study for two purposes: to evaluate and gain feasibility of the research processes (e.g. the use of e-survey system, data collection); and to improve quality of the Delphi questionnaire.

It is unclear how many pilot studies are needed in order to maximise the quality of a Delphi study (Keeney et al. 2011). However, it is generally recognised that the Delphi method requires resources and time (Powell 2003). Thabane et al. (2010) also noted that the objective of a pilot study is to improve the feasibility of the main study in light of how to answer the research question or to test hypothesis. From this caution, it may be impractical to conduct many pilot studies for a Delphi study. Hence, in this research project a single pilot study was conducted before the first round.

6.4.2 Target Population

It is suggested that the target population and the criteria for selecting participants in a pilot study should be the same as in the main study. The benefits of this notion are that participants will possess the desired background knowledge and experience which is helpful for improving the quality of a main study, and participants may have an opportunity to be familiar with a research tool (a questionnaire) – which will allow them to provide better responses in the main study (Murray 1999; Rattray and Jones 2007). The latter point may however increase bias within the study. Participants who are exposed to a questionnaire can have the opportunity to do homework (i.e. finding appropriate answers or references), or they may know how to provide answers which please the researcher (van Teijlingen and Hundley 2001).

For this research project, using the same criteria and population in both pilot and main study could provide more benefits than drawbacks. Valid responses which are relevant to the study and beneficial for the main study could be gained from participants who have the desired knowledge and experience. Participants who are familiar with the questions may provide more valid and higher quality responses in the main study. Therefore, in this research project, a pilot study utilised the same target population and criteria for selecting participants as the main study.

6.4.3 Number of the Participants

The total number of participants for a pilot study depends on the nature and purpose of the study (Rattray and Jones 2007; Thabane et al. 2010). Because this Delphi study utilised a questionnaire which contained both quantitative and qualitative parts as a data collection tool, the criteria for judging the quality of the questionnaire in both parts is required. Additionally, the optimum number of participants which maintains the quality of the result also needs consideration. It was asserted that, in a qualitative approach, the number of participants provides minimal effect to the study result because the main concerns are the methods of analysis and the interpretation of results (Marshall 1996; Okoli and Pawlowski 2004). Conversely, the number of participants is crucial for quantitative analysis as this reflects the power of analysis and quality of a result (Whitley and Ball 2002).

In this research study, Cronbach's alpha was selected as a criterion to evaluate the reliability of the questionnaire (see Section 6.4.7). Murray (1999) suggests that a sample size which is sufficient to calculate Cronbach's alpha should be at least 100 for a robust result. However, this concept may conflict with the nature of the Delphi method which aims to identify consensus and the relevant qualitative data in a specific area. The data from a quantitative analysis could only be used to support and explain the numerical characteristics of the consensus. Literature also advises that the sample size

is not the critical issue for a Delphi study if the panellists are heterogeneous (Campbell and Cantrill 2001; Keeney et al. 2011; Bloor et al. 2013). Hence, a minimum sample size for the calculation of Cronbach's alpha which is recommended for a quantitative study may not applicable for a Delphi study.

In summary, as the total number of respondents in a pilot Delphi study is arbitrary (i.e. depends on study context and researcher's decision). The expected minimum number of respondents in the pilot study was set at 10, which was convenient for data analysis.

6.4.4 Access and Sampling

A list of the attendees of ADEE meetings in 2010 and 2011 was used for selecting educator panellists, while a list of student delegates available on the EDSA website (http://www.edsaweb.org) was used for selecting student panellists. People on the list were divided into four groups by country and geographical area: Eastern, Northern, Southern and Western Europe (based on the classification from the United Nations). For the educator panel, all delegates who attended ADEE meetings in 2010 and 2011 were considered. However, using purposive sampling, only delegates who attended both meetings were selected to be in a sampling pool for the pilot study. It is possible that attendees who attended both meetings may have more interest in dental education and may have a greater tendency to participate and provide responses in the pilot study. Ten people in each geographical area were selected by using an online random number generator (Urbaniak and Plous 2013). There was a total of 40 educators and 40 students selected for the pilot study. The response rate was expected to be 25% of 40 participants as to meet the expected minimum number of respondents, which was set at 10.

6.4.5 Data Collection

The data collection process was divided into two trials – e-Delphi and paper-based Delphi (Figure 6.2). An invitation email for a pilot study, relevant documents, and a link to an online pilot questionnaire was sent to 40 selected educators. The first reminder and the final reminder were sent via email in weeks 3 and 4 respectively. Ultimately, there were only six educators and one student who responded and completed the pilot questionnaire. In order to achieve the expected number of respondents (10 respondents), an additional paper-based pilot study was conducted at the School of Dentistry, Cardiff University.

Figure 6.2 The pilot study process.
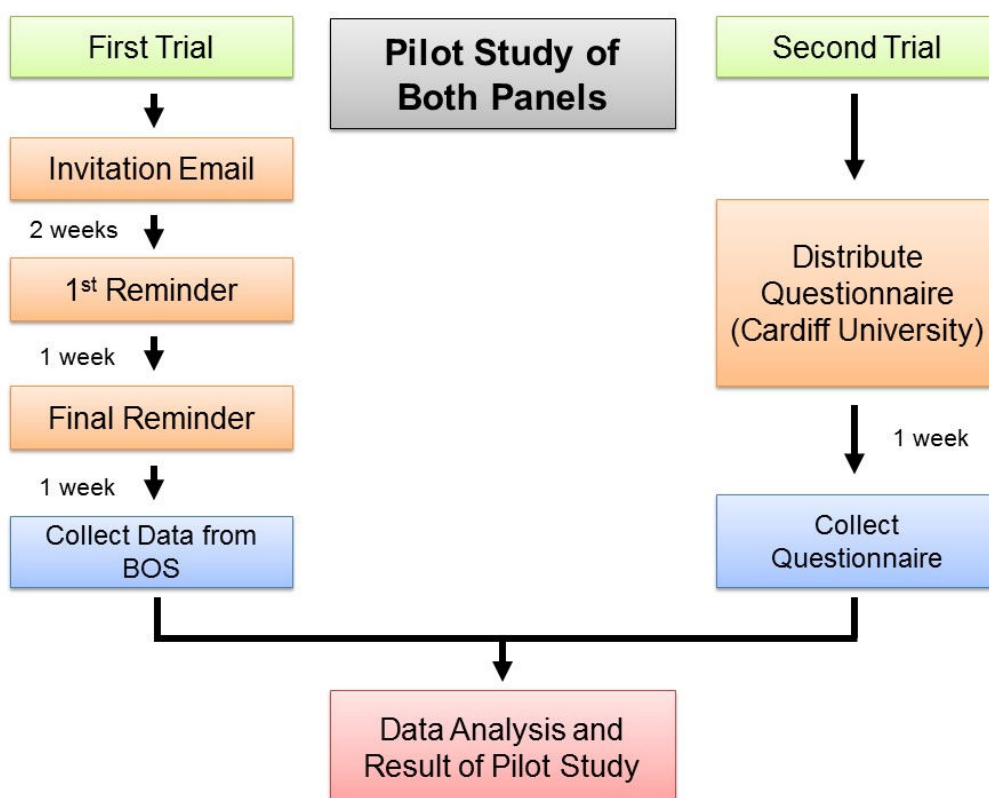
For the educator panel, five staff who were interested in dental education (but never attended any ADEE meetings) and involved in UG teaching were

invited to take part in the pilot study. For the student panel, 15 third-year students completed the pilot questionnaire. In total, the respondents of the pilot study included 11 educators and 16 students. It took five weeks to complete the data collection process.

6.4.6 Data Analysis

The aim of the data analysis in the pilot study was: to identify data analysis techniques which are practical and appropriate to the types of data collected, to identify any problem emerged during the data analysis process; and to allow the researcher to develop the necessary knowledge and skills for analysing data (e.g. use of statistics and data analysis software).

Data from the rating scales was analysed using summative statistics (percentage, mean, median, mode, standard deviation). Data from the comment boxes was categories under the topics and subtopics presented in the questionnaire. Demographic information was summarised using frequency and percentage. The data analysis was done by using MS-Excel as the total number of respondents was not high and the data was not structurally complicated enough to warrant other methods. However, it was expected that there would be more data collected during the Delphi rounds; data analysis software was considered to be used in the main study.

6.4.7 Quality of the Questionnaire

One objective of a pilot study is to improve quality of data collection tools used in a study (van Teijlingen and Hundley 2001). For validity, a questionnaire validation by educational experts occurred before the pilot study was launched. Hence, in this pilot study, only the reliability of the questionnaire was assessed.

Reliability is *"an examination of stability of the research conditions and procedures"* (Keeney et al. 2011, p. 96). The reliability of a survey questionnaire is *"a statistical measure of the reproducibility or stability of the data gathered by the instrument"* (Fink and Litwin 2003, p. 6). This possibly means that if a research study employed a survey questionnaire as a data collection tool, a similar result should be gathered when the questionnaire is administered in different times and contexts. However, in a Delphi study, the aim of iteration processes (subsequent rounds) is to allow respondents to change their opinions toward the study topic in order to achieve a group agreement or consensus. Thus, it is not necessary that the result of a subsequent round needs to be similar to the previous round if respondents alter their opinions. This nature of the Delphi method definitely violates the definition of reliability stated above.

Cortina (1993) has suggested that choosing a type of reliability to improve the quality of the study tool depends on certain factors. If the time-associated factors (e.g. the stability of the result when using a tool at a different time) are the main considerations, the common form of reliability (e.g. test-retest reliability) could be used. If the item-associated factors (e.g. different items measure the similar issue) are of interest, specific types of reliability (e.g. internal consistency) are required. In this study, the time-associated factors were not the main concern due to the nature of the Delphi method. The main interests were that: all sub-items in each question should measure the same issue within the main topic, and all sub-items should be correlated and complemented by one another. Therefore, internal consistency was chosen for measuring the reliability of the questionnaire.

A tool which is generally used for measuring internal consistency is Cronbach's alpha (α). It is a statistical value which reflects the interrelatedness of a set of items (Bland and Altman 1997; Fink and Litwin 2003). There is lack of evidence of using α to report on the internal

consistency of a questionnaire used in a Delphi study. Additionally, there is no clear rule or evidence for defining an acceptable level of α; therefore a low value of α might not reflect low reliability of the questionnaire (Schmitt 1996). This might be a reason why α is not usually reported and discussed in literature. However, it is necessary to set a satisfactory level of α in a study for gauging the quality of the questionnaire. Cronbach's alpha values of 0.7 – 0.8 are acceptable for a study which employs group comparison, while a clinical study may require higher values (Bland and Altman 1997). In this study, the level of Cronbach's alpha was set as demonstrated in Table 6.6.

Table 6.6 The level of Cronbach's alpha applied in the study.

Value	Definition
0.90 – 1.00	Excellent
0.80 – 0.89	Good
0.70 – 0.79	Acceptable
0.60 – 0.69	Questionable
0.50 – 0.59	Poor
Below 0.50	Unacceptable

In a Delphi study, there are other factors which determine reliability, including questionnaire development, panel size and selection procedure (Keeney et al. 2011). Using only α may not reflect all dimensions of reliability of the questionnaire. Therefore, in this study, α was used as an initial consideration for determining the quality of the questionnaire. Feedback on the questionnaire from educational experts and from the comment boxes (in the pilot questionnaire) were also used in addition to α when amending and finalising the questionnaire.

6.4.8 Questionnaire Amendment

Results from two sources were used for questionnaire amendment. The feedback from two educational experts suggested the re-wording of some questions and adjustment of the questionnaire's format. The result of the pilot study and feedback from participants on the questionnaire was taken into account for deleting and re-grouping educational content (subtopics) in the questionnaire.

Because there were several amendments on the questionnaire, the Cronbach's alpha was measured again in the main study so as to ensure the reliability of the questionnaire.

6.4.9 Lessons Learned

After conducting the pilot study, there were several issues which I, as a researcher, learned and gained understanding of during the research process. The issues informed the questionnaire amendment and in developing appropriate strategies for collecting and analysing data in the main study. These issues are research processes and research tools.

6.4.9.1 Research Process

There are several factors which determine the success or failure of the research process. The use of simple language and questionnaire formatting yield better understanding of the questions and the information of the questionnaire. Although the response rate of the e-questionnaire was very low, after sending the first reminder, some panellists sent me an email informing me that they were interested in taking part in the main study instead of the pilot study. This means that the reminder was still effective in gaining responses from participants. Additionally, educators responded to the e-questionnaire more than students. This could imply that the research topic

was more relevant to educators than students, so educators were aware of the importance of educational competences on their academic roles, while students only concentrated on their learning and practice. As a result, in the main study the e-questionnaire was continually used for the educator panel; in contrast, for the student panel, the paper-based questionnaire was distributed via face-to-face contact in the EDSA meetings (which allowed students to ask for clarification of the study).

6.4.9.2 Research Tool

I found that the e-questionnaire required much more time than anticipated to collect data because it depended on the availability of respondents. However, after sending the first reminder, more than 70% of the participants completed the questionnaire. Thus the reminder was essential for gaining and maintaining the response rate and resultant study quality.

As for the face-to-face contact, it had the tendency to encourage respondents to complete the questionnaire (especially in the student panel); however, I imparted no influence on participants' listed opinions. This situation perhaps occurred because the questionnaire was distributed when students were in a class where they thought that the class facilitator expected them to complete the questionnaire as a part of the lesson. Thus, in the main study, the questionnaire was distributed at the EDSA meeting where students were in a relaxed environment and were not influenced by academic issues or subtle pressures from the presence of staff.

6.5 Data Collection

6.5.1 Educator Panel

6.5.1.1 The First Round

The first round questionnaire was developed on the BOS system (Appendix B). People on the list of attendees of the ADEE meetings in 2010 and 2011 were divided into four groups by country and geographical area: Eastern, Northern, Southern and Western Europe. An invitation email (with an information sheet and a link to the online questionnaire) was sent to all educators in the list. They were allowed to contact the researcher if they needed further information or clarification.

The panellists were given four weeks to complete the questionnaire. A reminder email was sent to the non-respondents at the beginning of weeks 3 and 4, after the first questionnaire was sent. All questionnaires which were received after week four were not used in the data analysis. The data was retrieved from the BOS and was transferred into an MS-Excel format. Quantitative data from closed questions was imported to statistical analysis software (SPSS-20). Qualitative data from open questions was transferred and categorised using MS-Word and then was imported to qualitative data analysis software (NVivo-10). A feedback report was developed after the data analysis. All respondents were included in the second round unless they indicated that they wished to withdraw from the study.

6.5.1.2 The Second Round

Items which had not achieved consensus (see the definition of consensus in Section 6.6.1.2) in the first round were used together with information from the qualitative part of the first round questionnaire in order to construct the second round questionnaire. The group results (both consensus and non-

consensus items) and qualitative information were summarised into the feedback report.

An invitation email, a feedback report (which was developed uniquely to each respondent) and a link to the second questionnaire were sent to each respondent. There was no respondent who indicated that they wished to withdraw from the project. The second round questionnaire was also developed using BOS. It consisted of two sections: the instructions and the Delphi questions (ratings and comment boxes). Only non-consensus items were presented in the Delphi questions. The respondents were asked to re-rate their opinion toward the non-consensus items. A comment box was provided at the end of each question in order to allow the respondents to provide information to support their re-rating or to defend their previous rating. They were not allowed to add, delete, or adjust any item in the list in order to limit the scope of the study and prevent information overload during the data analysis. Although allowing participants to add or adjust information in every subsequent round may provide additional ideas to the study (de Villiers et al. 2005), it may compromise the quality of the results because it may increase disagreement among the panellists and additional rounds may be required (Delbecq et al. 1986). The questionnaire was administered and analysed using a similar process to the first round.

No additional subsequent round was launched as the result showed that the number of respondents (educators) in the second round was 73.6% (see Chapter 7), which exceeded but was near the desirable response rate of the study (70%). In addition, there was not much difference in opinions on non-consensus items between the first and second round results. Altogether, in order to prevent study fatigue of the respondents (which leads to attrition of the response rate) and to avoid unnecessary loss of time and resources, the study was completed in the second round.

The final report was sent to all respondents by email in order to verify the study's results and to allow respondents to give feedback on the result. The data collection of the educator panel is shown in the Figure 6.3.

Figure 6.3 The data collection process of the educator panel.
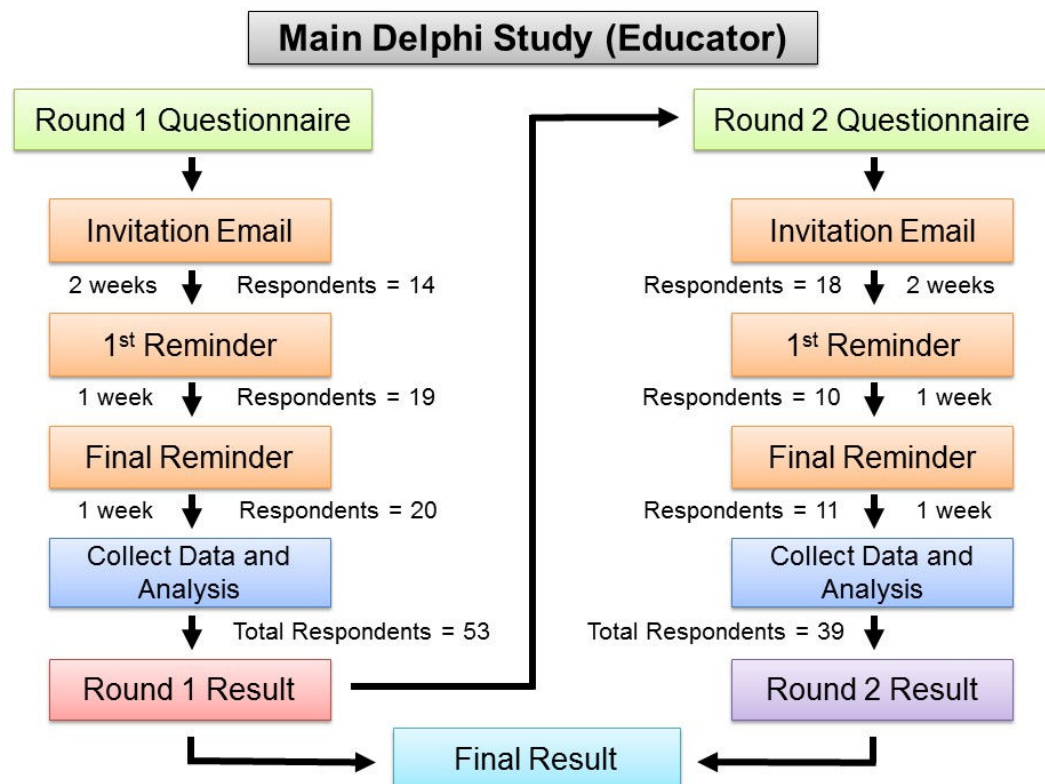
6.5.2 Student Panel

6.5.2.1 The First Round

The first round questionnaire was developed in a paper-based format (Appendix C). The questionnaire included an information sheet, a consent form, an invitation page, main questions, demographic information, and details of educational content. The questionnaire was distributed to and completed by student representatives from countries across Europe at the EDSA meeting in Lyon, France, 2012. They were allowed to contact the researcher if they needed further information or clarification.

The students were given four days to complete the questionnaire (during the EDSA meeting). All verified questionnaires were analysed. The data was processed into an MS-Excel format. Quantitative data was imported to statistical analysis software (SPSS-20). Qualitative data was transferred and categorised using MS-Word and was then imported into qualitative data analysis software (NVivo-10).

6.5.2.2 The Second Round

Items which did not achieve consensus in the first round were used together with information from the qualitative part of the first round questionnaire in order to construct the second round paper-based questionnaire. The questionnaire was developed uniquely to each respondent. It included an invitation page, the main questions (which provide the group mean and their individual response in the first round), and details of educational content (for non-consensus items). The questionnaire was completed by student representatives at the EDSA meeting in Belgrade, Serbia, 2013. The questionnaire was also administered and analysed using the similar process as the first round.

However, some respondents in the first round did not attend this meeting. It was expected that the response rate would be lower than 70%. As a result, a supplementary questionnaire was developed and distributed to students who did not participate in the first round (Appendix E). The aim of this questionnaire was to gather additional qualitative data from students (who did not participate in the first round) to support data analysis. The questionnaire included four parts: an invitation page, a consent form, the main questions, and demographic information. Students were asked if they agreed with the consensus and non-consensus items and provided opinion in a comment box. The data was imported to NVivo-10 software.

Similarly to the educator panel, the response rate in the second round was relatively low (43.6%) and there was not much difference between opinions on non-consensus items between the first and second round results. Therefore, the study finished in the second round. No subsequent round was launched.

The final report was sent to all respondents by email in order to verify the study's results and allow respondents to give feedback on the result. The data collection of the student panel is shown in the Figure 6.4.

Figure 6.4 The data collection process of the student panel.
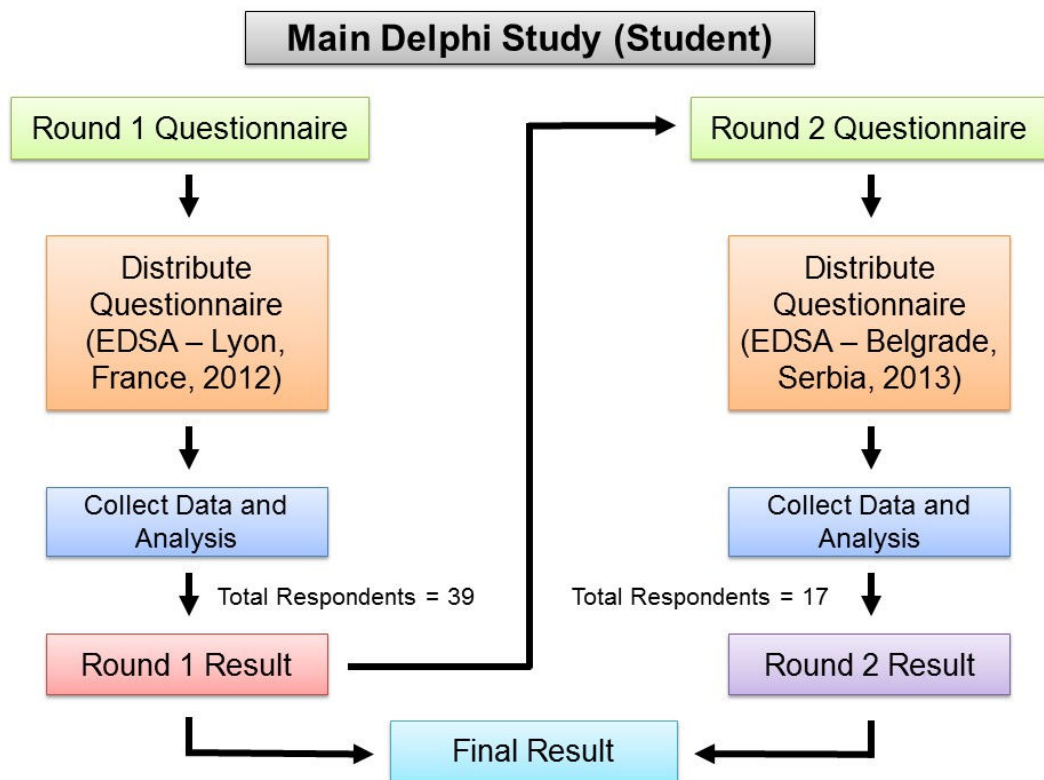
6.6 Data Analysis and Interpretation

The Delphi method is usually used to develop consensus, which is converged from accumulative opinions. In order to provide consensus, both the numerical properties of the group opinion and the qualitative contexts of the study need to be analysed (Powell 2003). This characteristic shows that the Delphi method is indeed a combination of both quantitative and qualitative methods (Keeney et al. 2011). Therefore, this study utilised both quantitative and qualitative analysis methods in order to identify consensus and interpret the data.

6.6.1 Quantitative Data

Quantitative analysis is used in a Delphi study to summarise and explain the group responses. The type of statistical method used for the analysis depends on the study's aim and the nature of the data (Keeney et al. 2001). Descriptive statistics (e.g. frequency, mean, median, standard deviation) were generally employed for representing the characteristics of the group opinion (Hasson et al. 2000; Alahlafi and Burge 2005; Clayton et al. 2006; Edgren 2006). A number of studies additionally employed inferential statistics (e.g. non-parametric analysis, factor analysis) (e.g. Macdonald et al. 2000; McLeod et al. 2003), which can be used to identify the relationship between specific factors in the study. Therefore, this study used both descriptive and inferential statistics to describe the findings of each Delphi round (Table 6.7).

Table 6.7 The statistical analysis used in the study.

Statistics	Aim
Frequency and Percentage	➤ Summarise data and indicate the level of consensus
Central Tendency (Mean, Median, Mode)	➤ Indicate the degree of group opinion
Standard Deviation	➤ Report the degree of dispersion of agreement
Wilcoxon Signed Tanks Test*	➤ Compare non-consensus items between round 1 and 2
Mann-Whitney U Test*	➤ Compare results between educator and student panels ➤ Identify relationship between results and demographic information (2 categories e.g. gender, educational environment)
Kruskal-Wallis Test*, **	➤ Identify relationship between results and demographic information (more than 2 categories e.g. country area, teaching experience)
* Confidence Level = 95% ** Applied Bonferroni adjustment for multiple significance tests	

6.6.1.1 A Critique of Quantitative Analysis

The rating scales have been criticised in that an equal interval between the scales may not be assured, therefore the scales might be interpreted differently depending on an individual's perception (Forrest and Andersen 1986). This reflects the ordinal characteristic of rating scales which need to be analysed only by non-parametric methods (Jamieson 2004). However a number of Delphi studies, including in the dental education arena (Hand 2006), treated rating scales as interval scales and utilised parametric statistical analysis. Carifio and Perla (2008) claim that rating scales can be perfectly treated as interval scales and that it is possible to apply parametric analysis to provide rigorous results. Norman (2010) verified by mathematical theories that if the scale was defined and distributed appropriately, parametric analysis could be used to analyse data. This possibly means that the use of statistical analysis for rating scales primarily relies on how the

scales are constructed. In this study, the scale was developed based on the ordinal property (the scales were: not necessary, optional, desirable, and essential). It could not assume the equal distribution between the scale items, and the interpretation of the scale might vary by the respondents. Therefore, when analysing data from rating scales, non-parametric statistics were selected as the main analysis. The mean and standard deviation (descriptive parametric statistics) were only used to reveal the tendency or degree of the opinions, making the data more understandable, helping the researcher when interpreting data.

6.6.1.2 Definition of the Consensus

Consensus in a Delphi study is the collective agreement of the panellists (Keeney et al. 2011). Theoretically, the consensus is achieved when all panellists agree or disagree on the issue (Stitt-Gohdes and Crews 2004); however, this concept is almost impossible in practice. Because there is no specific definition and recommendation about defining the level of consensus available, consensus in a Delphi study is subjective and arbitrary (Powell 2003). The level of consensus varies and depends on the study's aim; for example, it has been found to vary from 51% to 80% (Hand 2006; Fried and Leao 2007). It is generally recognised that a high level of consensus is difficult to achieve and a low level of consensus would provide low accuracy of the study results (Keeney et al. 2011).

Statistical figures could be used to support the level of consensus in several studies (e.g. Broomfield and Humphris 2001; de Villiers et al. 2005). The mean or median can be used to define the cut-off value of the agreement. This value depends on the rating scale and nature of data. Standard Deviation (SD) can be used to define the acceptable level of agreement dispersion. The accepted value of SD is 1.0 for a Delphi study when forecasting or identifying a particular issue (Robinson 1991).

Therefore, based on the literature, this research project used the level of consensus as showed in Table 6.8 to divide the result into three categories: consensus items (for inclusion in a curriculum), non-consensus items, and consensus items (for exclusion from a curriculum).

Table 6.8 The level of consensus defined in this study.

Category	Criteria
Consensus (Including)	➢ At least 70% of participants rated 3 or 4 on that item **and** ➢ Mean ≥ 3.2 **and** ➢ SD ≤ 1.0
Non-Consensus	➢ 30 – 69% of participants rated 3 or 4 on that item

	➢ At least 70% of participants rate 3 or 4 on that item **but**
	  ▪ Mean < 3.2 **or**
	  ▪ SD > 1.0

Consensus (Excluding)	➢ Less than 30% of participants rated 3 or 4 on that item

6.6.2 Qualitative Data

In a Delphi study, qualitative analysis is used to explain the rationale behind the consensus and create the linkage between the result and the contexts (Campbell and Cantrill 2001). It has been found that thematic analysis is usually used to identify main qualitative ideas (Hasson et al. 2000). There are several applications of thematic analysis which are generally used. Thematic analysis consists of these following processes: define the unit of analysis, define the code of the unit, categorise data by theme, summarise and describe the finding, and provide supportive evidence. All themes can also be adjusted over time by conducting additional data collection (Cohen et al.

2007). This study utilised thematic analysis for analysing all qualitative data. The literature was used to support the analysis and interpretation.

Some software packages have been developed to help researchers because qualitative data analysis is a time consuming process (e.g. ATLAS.ti, NVivo) (Cohen et al. 2007). These programmes have various abilities to help manage qualitative data, which include: categorising, coding, sorting, and creating logical order (Pope et al. 2000). Although these programmes can help researchers to manage qualitative data during the analysis process, none of them can be used to analyse and interpret data. Researchers still have to analyse, summarise, conceptualise, and interpret data by themselves (Thorne 2000). All questionnaires used in this study contained a number of comment boxes so as to gather data to support the consensus and to identify the factors influencing the curriculum content.

The qualitative data in this study was initially categorised manually (paper-based) (Appendix L); subsequently, NVivo-10 software was used to support the systematic coding and categorisation of data. Then, the researcher analysed the codes and developed themes and subthemes from the analysis with literature support.

6.7 Data Verification

One limitation of the Delphi method is that although the consensus is made by heterogeneous expert panellists, it could be argued that the experts' opinions may not reflect the general opinion of the whole population and the results may not be fully generalised in a wider context. Presenting the result to an interest group (e.g. in a conference) in order to gather feedback from the audience is an effective strategy used by Macdonald et al. (2000). Because the delegates usually come from different countries and

backgrounds, their aid in validating the results would ensure that the consensus has been initially approved by a wider audience. The quality and generalisability of the results could be improved. Therefore, I decided to conduct data verification sessions at two European conferences to obtain feedback from and gain approval by the wider group of dental educators and students.

A questionnaire for data verification was developed in order to gather agreement and comments on the educator-curriculum (Appendix F and G). There were questionnaires for educators and dental students. The questionnaire comprised four sections: invitation, the curriculum model, three main questions, and demographic information. The main questions asked whether the respondent agreed or did not agree with the core and optional content of the educator-curriculum. The open-ended parts were provided to ask the respondent factor and issues which need consideration when tailoring an educator-curriculum in their organisation or country. Only the demographics section is different between both questionnaires.

Both questionnaires were sent to two educational experts (the same people who validated the initial questionnaire) to help in checking clarity and content validity of the questionnaire. Both educational experts agreed with the content in the questionnaires. The questionnaires were distributed and completed at the EDSA and ADEE 2013 conferences (Birmingham, UK) by students and educators respectively. Quantitative data was analysed using descriptive statistics. Qualitative data was categorised using the themes that emerged from qualitative data analysis of the main Delphi study. The summary of all activities of the data collection and analysis are demonstrated in Table 6.9.

Table 6.9 Diagrammatic presentation of time line for data collection.

Date		Activity		Aim
2011	7	Questionnaire development		Preparing for data collection
	8			
	9			
	10			
	11	Sending the questionnaire to experts		
	12	Ethical approval		
2012	1			
	2	Pilot study (Educator) -Online/Cardiff-		Research objective number 1, 2 and 3
	3		Pilot study (Student) -Online/Cardiff-	
	4			
	5	Delphi round 1 (Educator) -Online-		
	6			
	7			
	8		Delphi round 1 (Student) -EDSA-	
	9			
	10	Delphi round 2 (Educator) -Online-		
	11			
	12			
2013	1	Final result (Educator)		
	2			
	3		Delphi round 2 (Student) -EDSA-	
	4			
	5		Final result (Student)	
	6	Modelling a curriculum content for dental educators		
	7	Developing a questionnaire for data verification		Verifying the result
	8	Data verification (Educator) -ADEE-	Data verification (Student) -EDSA-	
	9			

6.8 Quality of the Research

During the Delphi process, individuals can adjust their opinions towards the group opinion. From the quantitative aspect, this nature could violate the reliability of the result. Meanwhile, from the qualitative viewpoint, changing opinion towards the consensus could improve the quality and validity of the result. The main consideration needs to be the quality of the consensus and relevant data, rather than their quantity. Keeney et al. (2011) claim that quantitative methods are usually used to summarise the findings of a Delphi study; however, the core result of the study is the consensus and its qualitative contexts. Consequently, criteria for judging a qualitative study or 'trustworthiness' would be more appropriate to assess the quality of Delphi study. Therefore, four qualitative criteria: credibility (internal validity), transferability (external validity), dependability (reliability), and confirmability (objectivity) (Tobin and Begley 2004) were used for judging the quality of this research.

6.8.1 Credibility

Credibility is the accuracy of the study and it is used to measure or explain attributes of the phenomena (Jackson and Verberg 2007). The importance of credibility in a Delphi study is to assure that the consensus is the appropriate answer for the research question (Keeney et al. 2001). There are several procedures which this study utilised to increase credibility.

(1) Purposive sampling was used to select the panellists who have relevant knowledge and experience of the study. Using purposive sampling can improve the content validity of the Delphi result because the respondents can provide information which directly relates to the research area (Hasson et al. 2000).

(2) The panellists were heterogeneous as they were both educators and dental students from different European countries. This led to the emerging of a variety of information. Credibility of the Delphi study

directly relates to the heterogeneity and representativeness of the panel (Rowe and Wright 1999).

(3) Literature shows that sending a questionnaire to educational experts to improve the clarity and readability could enhance the quality (i.e. content and construct validity) of the questionnaire (Okoli and Pawlowski 2004). In this study, the questionnaires were verified by two educational experts who came from different disciplines and backgrounds. They could provide beneficial feedback for improving the rigour and trustworthiness of the questionnaire.

(4) The questionnaire was piloted and amended before use in the main study so as to assure the practicality of the data collection process and also the clarity and validity of the questionnaire. A pilot study can improve the content validity of the questionnaire and improve the acceptability of the results (van Teijlingen and Hundley 2001).

(5) Full quotations with literature support were used during the data analysis. Use of evidence and fully-transcribed data can reduce research bias during the analysis which can gain credibility of the result (Williams and Webb 1994).

(6) The several pages of raw qualitative data along with the initial coding were sent to the two educational experts (who took part in validation the questionnaires). They were asked to code the data, compare their coding with the coding produced by the researcher, and provide feedback of researcher's coding. Allowing other researchers to analyse qualitative data (including coding some parts of the data, comparing coding amongst the researchers, and discussing the coding result) can improve the trustworthiness of the result (Hoepfl 1997).

(7) The final report was sent to all respondents in order to verify the group consensus. Use of external audits can increase the credibility of the Delphi result (Hill and Fowles 1975).

6.8.2 Transferability

Transferability is the fittingness of the research results to different contexts (Jackson and Verberg 2007). It has been argued that the consensus may lack transferability due to several characteristics of the Delphi method. Although purposive sampling can provide panellists who have important information for the study, it cannot assure the representativeness of the panellists; so the result may not be applicable in other contexts (Broomfield and Humphris 2001). The panel size of a Delphi study is usually small; therefore, the result may not reflect the information from the whole population (Kilroy and Driscoll 2006). However, Okoli and Pawlowski (2004) argue that utilising a heterogeneous panel, which can provide a wide range of information from different experience and background, can defend the transferability of the Delphi result. Moreover, providing sufficient information and demonstration of the connection between the findings and the results in the recent literature can allow readers to understand the contexts of the study and to be able to apply the results into other situations (Riege 2003).

In order to maintain transferability of the results, this study comprised heterogeneous panellists who were representatives from their countries. In addition, all processes in this research were systemically represented in the final report and the thesis in order to improve the applicability of the results.

6.8.3 Dependability

Dependability is the stability of the study's results (Jackson and Verberg 2007). Due to the nature of Delphi method (which often provides bias from several aspects) dependability can be a major weakness of this technique. For this reason dependability, rather than the reproducibility of the results, is usually considered in the study process (Keeney et al. 2011). There are two issues which need to be considered in order to maintain the dependability of Delphi results (Hill and Fowles 1975). There should be clarity of the

questions in the questionnaire and the response rate in each round should be high enough to assure the dependability of the quantitative results.

This study utilised two procedures to improve the dependability. The questionnaire was piloted in order to adjust and improve the clarity before it was sent to the panellists. A pilot study helps a researcher to assess the quality of a data collection tool and gain a higher level of dependability (van Teijlingen and Hundley 2001). An advanced notice and follow-up email were used to increase the response rate of each round. This strategy has been found elsewhere to be the most effective process to improve the response rate and dependability of study results (Roth and BeVier 1998).

6.8.4 Confirmability

The concept of confirmability is that the study needs to represent neutrality (i.e. having no subjectivity or bias) (Jackson and Verberg 2007). Subjectivity and bias usually occurs because the Delphi method mainly involves human knowledge and experience, and the researcher plays an important role in data interpretation (Keeney et al. 2011). Davies and Dodd (2002) report that subjectivity and bias are of course inevitable in any study which involves human interpretation. To improve confirmability, the role of the researcher that involves all personal interpretation of phenomena and contexts, possible subjectivity, and biases need to be acknowledge and demonstrated explicitly (i.e. addressing 'reflexivity') (Cohen et al. 2007) and the researcher should represent the neutrality on these issues (Patton 2002).

Therefore, I demonstrated reflexivity in this research project by clearly representing the subjectivity, arbitrariness, and biases throughout the thesis (e.g. using the pronoun 'I' to express my personal opinion). Moreover, although the qualitative data analysis may generate biases from the researcher (by understanding and interpreting the data), I was not involved in

any of the decision making of the panellists during the data collection in order to maintain the neutrality of the researcher.

A summary of the quality of this research project is represented in Table 6.10

Table 6.10 Strategies for improving research quality.

Credibility (Internal Validity)
1. Purposive sampling
2. Heterogeneous panellists
3. Questionnaire approval (by experts)
4. A pilot study
5. Using full quotation for data analysis
6. Data analysis approval (by Experts)
7. Verifying the final report

Transferability (External Validity)
1. Heterogeneous panellists
2. Systemically represented data/result

Dependability (Reliability)
1. A pilot study
2. Using strategies to gain response rate

Confirmability (Objectivity)
1. Addressing reflexivity
2. Neutrality of the researcher

6.8.5 Triangulation

It is sometimes advised that triangulation (e.g. collecting data from multiple sources by using multiple methods with multiple researchers) should be used in order to improve the trustworthiness of a qualitative study. The rationale of triangulation is based on the belief that using a single method or tool is inadequate to explain the relevant realities (Patton 2002). Triangulation can increase the trustworthiness of the study by supporting both credibility and

dependability. It allows researchers to develop deep insights and to construct divergent understandings from multiple realities which improve the completeness of interpretation; consequently, it can enhance the credibility of a study (Golafshani 2003). In addition, information which is gathered from multiple approaches can increase the consistency of data because they allow cross-checking of data; consequently, dependability is also improved (Tobin and Begley 2004).

Triangulation has been recognised as an important characteristic of the Delphi method because its result is developed from several information sources and tools (e.g. group judgement, statistics) (Campbell and Cantrill 2001). In addition, this technique also combines both quantitative and qualitative methods (Keeney et al. 2011).

In this study, triangulation was achieved by three processes: firstly, by using information from health professional education programmes to support the literature analysis when developing the questionnaire as well as using literature to support the results; secondly, by using results from the student panel to support and compare with the main finding of the educator panel; thirdly, by using both a rating scale (quantitative) and open questions (qualitative) in the questionnaire to gather opinions.

6.9 Research Ethics

There are four ethical issues which were raised by this research project - anonymity, confidentiality, respect for human dignity and beneficence, and non-maleficence.

6.9.1 Anonymity

The concept of anonymity is that no one knows the identity of the individual panellist in their contributions (Keeney et al. 2011). There are several benefits of anonymity in the Delphi study (Broomfield and Humphris 2001). Each individual can represent their true opinion without feeling any pressure or influence from other panellists or external factors. Respondents can change their opinion in each round without experiencing negative feelings or losing face. Stitt-Gohdes and Crews (2004) claim that anonymity is the strongest feature of the Delphi method. However, it can be argued that complete anonymity may not provide any benefits to this study. When all of the panellists are anonymous, if they have a query during the data collection process they will be unable to receive any clarification from the researcher. Moreover, it would be impossible for the researcher to follow-up the non-respondents in order to maintain the response rate of each round. Consequently, complete anonymity may in practice alter the trustworthiness of the results. Okoli and Pawlowski (2004) also acknowledge that complete anonymity does not occur in many Delphi studies because the panellists may possibly know each other if they work in similar areas. In addition, the researcher, or the person who has access to the panellists, would know their identity. Because of these issues, the term 'quasi-anonymity' may be found to be more appropriate for use in Delphi studies. The concept of quasi-anonymity can permit the researcher to know the identity of the panellists, and it can allow the panellists to know each other's identity; however, no one involved in the study is made aware of the response or opinion of each named individual panellist (Hasson et al. 2000).

This study applied the concept of 'quasi-anonymity' to maintain the anonymity of the research process. The researcher knew the identity of each panellist, which allowed the panellists to ask for clarification of the study and allowed the researcher to follow-up the non-respondents during the data collection process. Several panellists also knew other's identity through the professional bodies (ADEE and EDSA) where they attended previously;

however, in this study no single respondent knew the response or opinion of the other respondents.

6.9.2 Confidentiality

Confidentiality ensures that the personal information of the respondents is securely kept and nobody (except the researcher) can access this information and reveal the identity of the panellists (Keeney et al. 2011).

In this study, electronic files which contain respondents' personal information, response, coding, and other documents were stored on a password-protected computer. Only the researcher knew the password and had access to the information during the data analysis. The hard documents which contain respondents' information (e.g. consent form) were kept in a folder and stored in a drawer with a security lock. Once the project is completed and any papers resulting from the project have been accepted for publication, the computer files and hard copy documents will be permanently deleted and shredded respectively.

6.9.3 Respect for Human Dignity and Beneficence

Respect of human dignity ensures that the panellists have the right to self-determination. In other words, they have right at any point to participate in, or reject, or withdraw from a study (Orb et al. 2001). Beneficence recommends that respondents should know about the full procedure, risks, and benefits of a study (Keeney et al. 2011).

In this study, a consent form and information sheet which describes the research aims, research procedures, risks and benefits, and the right of participant were used for both educator and student panels. For the online

questionnaire (educator panel), the consent form was presented to the respondents before the main questions page. For the paper-based questionnaire (student panel), the consent form was attached with the questionnaire. The respondents were able to decide to participate, or not, in the study. They were also able to withdraw from the study whenever they wish.

6.9.4 Non-Maleficence

The concept of non-maleficence ensures that the researcher does no harm to the respondents (Keeney et al. 2011). In this study non-maleficence was assured by two elements. The questionnaire did not contain statements which provide negative or uncomfortable feelings to respondents. The pilot study also ensured that the questionnaire contained neither negative nor intimidating language. The follow-up email used positive language which motivates non-respondents. At no point was threatening language being used to force the non-respondents to complete the questionnaire.

6.9.5 Ethical Approval

This research project was submitted to the ethics committee of the School of Dentistry, Cardiff University and received the ethical approval on the 23rd January 2012. No additional ethical approval was required from the institutions where the panellists were working or studying.

Chapter 7 Results and Discussion (Overview)

This chapter presents the results of this research project with general discussions. It presents demographic information on respondents, Cronbach's alpha, and an overview of consensus and non-consensus items. The chapter comprises four sections: pilot study, main study, data verification, and the educator-curriculum.

7.1 Pilot Study

The pilot study's purpose was to evaluate and assess the feasibility of the research processes as well as improve the quality of the Delphi questionnaire. Demographic information of the pilot study of both panels is presented in Table 7.1 and 7.2.

Table 7.1 Demographic information of the pilot study (educator panel).

Information		Number	
Number of Participants		11	
Gender	Male	7	64%
	Female	4	36%
Age	26 – 35	-	-
	36 – 45	1	9%
	46 – 55	2	18%
	56 – 65	5	46%
	Over 65	3	27%
Country	Eastern Europe	1	9%
	Northern Europe	7	64%
	Southern Europe	3	27%
	Western Europe	-	-
Teaching Experience	Up to 5 years	2	18%
	Between 6 and 12 years	1	9%
	13 years and over	8	73%
Academic Position	Full-time	8	73%
	Part-time	3	27%
	Average sessions per week (for Part-time)	6.5 (19.5 hours)	
Proportion of the job which involves teaching undergraduate students	Up to 20 %	3	27%
	21 – 40 %	2	18%
	41 – 60 %	1	10%
	61 – 80 %	2	18%
	More than 80 %	3	27%
Educational Environment which the participants have been involved or experienced	Classroom-Based	7	63%
	Laboratory-Based	3	27%
	Clinical-Based	9	82%
	Outreach/Community/Workplace-Based	2	18%
	Other	-	-

Table 7.2 Demographic information of the pilot study (student panel).

Information		Number	
Number of Participants		16	
Gender	Male	5	31%
	Female	11	69%
Age	Below 25	16	100%
	25 – 30	-	-
	Over 30	-	-
Country	Eastern Europe	-	-
	Northern Europe	15	94%
	Southern Europe	-	-
	Western Europe	1	6%
Year of Study	First Year	-	-
	Second Year	-	-
	Third Year	-	-
	Fourth Year	16	100%
	Fifth Year	-	-
Educational Environment which the participants have been involved or experienced	Classroom-Based	16	100%
	Laboratory-Based	16	100%
	Clinical-Based	15	94%
	Outreach/Community/Workplace-Based	12	75%
	Other	-	-

In a Delphi study in which the panel is heterogeneous, the sample size for calculating Cronbach's alpha (α) is arbitrary and depends on the nature of a study (Campbell and Cantrill 2001). In this study, the total number of respondents in the pilot study (11 educators and 16 students) exceeded the expected number of 10 which is a minimum number for calculating Cronbach's alpha (see Chapter 6). It was therefore possible to examine the quality of the Delphi questionnaire using α analysis. The majority of respondents were from Northern Europe (e.g. UK). Non-representative respondents would not bias the pilot study's results as the pilot study did not focus on a generalised conclusion.

The Cronbach's alpha of many topics and of the whole questionnaire was high in both panels (Table 7.3). This suggests the questionnaire had high internal consistency. However, it is found that α in some topics was lower than the acceptable level. This could be a result of not clearly understanding the terminologies used in the questionnaire. However, educators are generally familiar with the educational terms as they are regularly involved in providing education and/or some may have had educational training

In Topic 2 'Modes of Education', α was high in the educator panel but low in the student panel. Students might lack understanding of, for example, what is interprofessional education. In Topic 10 'Quality Assurance', α was high in the student panel but low in the educator panel. Educators may be confused with the terms 'Audit', 'Quality', and 'Standards' while students may oversimplify the terms and not have understood them fully. In Topic 4 'Educational Materials and Instructional Design', α was relatively low in both panels. It might be that respondents did not fully understand the definitions of terms used in this topic.

Table 7.3 Cronbach's alpha for the pilot study.

Topic	Educator	Student
1. Educational Theories and Principles	0.63	0.75
2. Modes of Education	0.78	0.52
3. Learner's Issues	0.85	0.92
4. Educational Materials and Instructional Design	0.54	0.64
5. Assessment and Feedback	0.88	0.78
6. Curriculum	0.86	0.67
7. Evaluation	0.91	0.72
8. Educational Research	0.78	0.79
9. Educational Management	0.93	0.86
10. Quality Assurance	0.68	0.95
11. Patient Care and Health Care System	0.77	0.85
12. Professionalism	0.94	0.92
The Whole Questionnaire	0.98	0.92

Colour Code: Acceptable/Good/Excellent   Questionable   Poor

The above examples are relevant to the main problem found in the pilot study. The questionnaire contained a number of statements that included educational jargon, complicated sentence structure, and inappropriate format. Consequently, there were several amendments of the questionnaire based on feedback from experts and respondents.

1. Several questions and content were re-worded to improve the clarity and reduce ambiguity of the questionnaire.
2. Although the BOS system did not allow the change of font size or questionnaire format, the key message was emphasised by using bold font.
3. Educational content in several topics was re-grouped, re-ordered, or deleted to ensure that the content was relevant to the topics.
4. Several items in the 'More Info' box were amended and further clarified.

7.2 Main Study: Demographic Data and Cronbach's Alpha Analysis

Two rounds of Delphi were conducted using an online questionnaire (educator panel) and a paper-based questionnaire (student panel). Demographic information related to the main study of both panels is presented in Table 7.4 and 7.5

Fifty three educators agreed to be included in the Delphi panel and completed the first round questionnaire. After three reminders, 39 educators (73.6% response rate) completed the second questionnaire. This response rate was sufficiently high to provide a defensible and rigorous result. The response rate of a Delphi study should not be lower than 70% in order to provide meaningful results (Kilroy and Driscoll 2006).

Thirty nine students agreed to be included in the Delphi panel and completed the first round questionnaire. After conducting the second round (EDSA meeting, Serbia, 2013) only 17 students (43.6% response rate) completed the questionnaire. This response rate was relatively low and could compromise the quality and rigour of the results. Consequently, I decided to distribute a supplementary questionnaire to students who had not previously participated in this research project. Non-panellist students agreed that all consensus items are essential and agreed that most non-consensus items are important and need to be included in the educator-curriculum (Appendix E). The results from the supplementary questionnaire were also consistent with the Student Round 2 results. This suggests that students' opinions were unanimous and provided support for the results of the educator panel.

Table 7.4 Demographic information of the main study (educator panel).

Information		Round 1		Round 2	
Number of Participants		53		39 (73.6% RR)	
Gender	Male	33	62%	27	69%
	Female	20	38%	12	31%
Age	26 – 35	3	6%	3	8%
	36 – 45	8	15%	5	13%
	46 – 55	21	40%	16	41%
	56 – 65	16	30%	11	28%
	Over 65	5	9%	4	10%
Country	Eastern Europe	3	6%	1	3%
	Northern Europe	27	51%	20	51%
	Southern Europe	6	11%	5	13%
	Western Europe	17	32%	13	33%
Teaching Experience	Up to 5 years	5	9%	5	13%
	Between 6 and 12 years	9	17%	5	13%
	13 years and over	39	74%	29	74%
Academic Position	Full-time	39	74%	28	72%
	Part-time	14	26%	11	28%
	Average sessions per week (for Part-time)	6.3 (19 hours)		5.4 (16 hours)	
Proportion of the job which involves teaching undergraduate students	Up to 20 %	9	17%	7	18%
	21 – 40 %	22	41%	18	46%
	41 – 60 %	12	23%	7	18%
	61 – 80 %	3	6%	2	5%
	More than 80 %	7	13%	5	13%
Educational Environment which the participants have been involved or experienced	Classroom-Based	40	76%	30	77%
	Laboratory-Based	17	32%	12	31%
	Clinical-Based	33	62%	28	59%
	Outreach/Community/Workplace-Based	9	17%	6	15%
	Other (e.g. PBL)	10	19%	8	21%

RR = Response Rate

Table 7.5 Demographic information of the main study (student panel).

Information		Round 1		Round 2	
Number of Participants		39		17 (43.6% RR)	
Gender	Male	15	38%	8	47%
	Female	23	59%	8	47%
	No Information	1	3%	1	6%
Age	Below 21	2	5%	2	12%
	21 – 30	37	95%	15	88%
Country	Eastern Europe	6	15%	2	12%
	Northern Europe	16	41%	7	41%
	Southern Europe	15	39%	7	41%
	Western Europe	2	5%	1	6%
Year of Study	Second Year	1	3%	1	6%
	Third Year	4	10%	2	12%
	Fourth Year	18	46%	7	41%
	Fifth Year	15	38%	7	41%
	Sixth Year	1	3%	-	-
Educational Environment which the participants have been involved or experienced	Classroom-Based	35	90%	16	94%
	Laboratory-Based	31	80%	13	77%
	Clinical-Based	39	100%	17	100%
	Outreach/Community/ Workplace-Based	18	46%	9	53%
	Other (e.g. PBL)	4	10%	-	-

RR = Response Rate

Regarding the demographic information, there was no statistically significant difference between both rounds of each panel. However, there were several statistically significant differences of the demographic information between educator and student panels (Table 7.6).

In the educator panel, there were more male participants than female participants. More than 80% of participants were 46 years old or older. The majority of respondents are from Northern and Western Europe. Until recently in Northern and Western Europe, dentistry was predominantly a male profession. In the student panel, there were more female participants and the majority of participants were from Northern and Southern Europe. This gender distribution possibly reflects the current ratio in dentistry. However, exploring the gender distribution in dentistry was not the aim of this study.

Table 7.6 Statistically significant differences of some demographic information between educator and student panels.

Round	Information		Educator		Student		Significant Difference (Chi-square test) α = 0.05
1	Country	Southern Europe	6	11%	15	39%	p=0.000
		Western Europe	17	32%	2	5%	
	Educational Environment which the participants have been involved or experienced	Laboratory-Based	17	32%	31	80%	p=0.000
		Clinical-Based	33	62%	39	100%	p=0.000
		Outreach/Community/ Workplace-Based	9	17%	18	46%	p=0.003
2	Country	Southern Europe	5	13%	7	41%	p=0.017
		Western Europe	13	33%	1	6%	
	Educational Environment which the participants have been involved or experienced	Laboratory-Based	12	31%	13	77%	p=0.002
		Clinical-Based	28	59%	17	100%	p=0.001
		Outreach/Community/ Workplace-Based	6	15%	9	53%	p=0.006

More than 80% of educators in the panel were from Northern and Western Europe while the majority of students were from Northern and Southern Europe. This uneven ratio of respondents' countries might influence the study's results. Regardless of the country, all respondents are in the European context and share common understandings of European dental education. Furthermore, respondents were from all areas across Europe; this supports the heterogeneity of the panel. However, this research project might lean toward the curriculum contexts in Northern and Western Europe more than other European areas.

Approximately 90% of educators in both rounds had more than five years teaching experience. This strengthens the credibility of the study results. The

more teaching experience the educators had, the more likely they would understand the UG-curriculum and educational process. This level of experience would allow them to identify problems in the educator-curriculum, their educational needs and areas of further pedagogical development.

Three quarters of participants were full-time educators while the rest of the participants were part-time educators who had teaching sessions for more than half a week. This suggests that all educators were familiar with UG-DentEd and experienced in many aspects of the curriculum contexts and roles. This profile suggests that panel members should be able to identify educational needs and areas of improvements in many aspects related to their roles within the UG-curriculum. Additionally, for part-time educators, although their roles mainly involve teaching and learning, the high average number of session per week would suggest that they would be familiar with and have appropriate experience of UG-DentEd. Therefore, an agreed educator-curriculum content developed as a result of this research study should reflect all aspects of the roles and responsibilities in an UG-curriculum.

More than 80% of educators were involved in teaching at an UG level for at least 20% of their work load. The result is congruent with previous literature that teaching is one of the four major roles of educators (Prideaux et al. 2000; Hand 2006; Harris et al. 2007). It is likely that most of educators were full-time senior educators, according to age, teaching experiences and academic position, with accumulated experience in UG-DentEd. Hence, their opinions are valuable sources of information about dental education. This also supports the validity and comprehensiveness of the study's results.

Three quarters of educators were involved in university-based education especially in classroom-based and clinical-based teaching. It should be

recognised that the study results might primarily represent curriculum content for university-based educators who provide teaching at the clinical level. However, basic science educators and educators in a community or outreach environment could benefit from this study.

All students were involved in clinical-based teaching as the majority of student participants were studying in their clinical years. It is possible that the more experience within the curriculum they had, the more meaningful opinions they could provide in the study. Thus, data gathered from students is valid and defensible.

Cronbach's alpha was re-calculated in the first round for analysing the internal consistency of the questionnaire (Table 7.7) as the questionnaire was amended after the pilot study,

Table 7.7 Cronbach's alpha of the first round.

Topic	Educator	Student
1. Educational Theories and Principles	0.68	0.76
2. Modes of Education	0.57	0.66
3. Learner's Issues	0.71	0.57
4. Educational Materials and Instructional Design	0.77	0.76
5. Assessment and Feedback	0.71	0.70
6. Curriculum	0.79	0.86
7. Evaluation	0.73	0.67
8. Educational Research	0.89	0.86
9. Educational Management	0.86	0.80
10. Quality Assurance	0.90	0.89
11. Patient Care and Health Care System	0.87	0.76
12. Professionalism	0.90	0.75
The Whole Questionnaire	0.94	0.91

Colour Code: Acceptable/Good/Excellent   Questionable   Poor

The level of α of many topics and of the whole questionnaire was high in both panels. Also, in Topic 4, 6, and 10 where α fell below the acceptable level in the pilot study, the level of α of these topics was improved. The level of α of Topic 1 (educator panel) and Topic 2 and 7 (student panel) fell to a questionable level. One might interpret that there was slight inconsistency of items within these topics. However, the use of α is arbitrary depending on the study and the researcher's decision (Schmitt 1996) and using α to analyse internal consistency in a Delphi study has not been substantiated. Thus, the questionable level of α may not necessarily reflect the inconsistency among items. The α of these topics were very near the acceptable level (0.7) and the questionnaire had been piloted; therefore, it was decided to treat the level of α of these topics as acceptable.

The level of α of Topic 2 (educator panel) and Topic 3 (student panel) fell into the poor level which reflects low internal consistency. However, this problem may not have been caused by respondents who did not understand the questions because the questionnaire was validated, piloted, and amended before being used in the main study. One possible explanation lies in the nature of the Delphi technique and the aims of this research project. Within a topic, if participants unanimously agree on items (inclusion or exclusion), the level of α must be high since items are responded to similarly (consensus). However, if the topic contains items which are responded to diversely (non-consensus), the level of α must be low. Hence, it probably indicates that Topic 2 and 3 contained several controversial items or had too many aspects that generated disagreement amongst participants and caused the low level of α. There may be underlying factors which influence participants' opinions and require further exploration.

The analysis of Cronbach's alpha suggests that the Delphi questionnaire provides rigorous and meaningful results. Both panels had a high level of agreement in most topics except Topic 2 (educator panel) and Topic 3 (student panel).

7.3 Main Study: Results

This section represents the results and a brief discussion relating to the total number of consensus and non-consensus items. The full result and in-depth discussion will be provided in the next chapters.

The questionnaire consisted of 12 educational topics. The total number of items was 51. Of the 51 items, 38 items (75%) of the educator panel and 43 items (84%) of the student panel achieved consensus for inclusion in an educator-curriculum (Table 7.8). In the second round of the educator panel, of 14 non-consensus items from the first round, only one item achieved consensus. The disagreement on the 13 items was probably influenced by external factors which the quantitative tool (rating scales) could not explore. Statistical figure of each item will be presented in Chapter 8 and 9. None of the items in both panels had SD greater than 1.0.

Table 7.8 Total number of consensus and non-consensus items in educator and student panels.

Topic	Number of Items	Educator			Student		
		Consensus (Including)	Non-Consensus	Consensus (Excluding)	Consensus (Including)	Non-Consensus	Consensus (Excluding)
1. Educational Theories and Principles	7	7	-	-	6	1	-
2. Modes of Education	6	3	3	-	4	1	1
3. Learner's Issues	3	2	1	-	1	2	-
4. Educational Materials	2	2	-	-	2	-	-
5. Assessment and Feedback	6	6	-	-	5	1	-
6. Curriculum	3	3	-	-	3	-	-
7. Evaluation	2	2	-	-	2	-	-
8. Educational Research	2	-	2	-	1	1	-
9. Educational Management	5	1	4	-	4	1	-
10. Quality Assurance	3	2	1	-	3	-	-
11. Patient Care and Health Care System	2	1	1	-	2	-	-
12. Professionalism	10	9	1	-	10	-	-
Total	51	38	13	-	43	7	1

In the student panel second round, of 15 non-consensus items from the first round, eight items achieved consensus. There are two possible reasons for this. First, although students lacked educational knowledge and were not familiar with specific jargon, they gained more experience and understanding after the first round or after they asked the researcher for clarification. Thus, the higher level of agreement was achieved after they had an understanding of educational terms. Second, students possibly expected their educators to be ideal teachers who are competent in everything (relating to UG-DentEd) without realising educators also have other roles and responsibilities in their career (e.g. research commitments).

However, although students may have a relatively simplistic perception, their opinions may suggest issues which educators need to be aware of or require further development. In Topic 9 where most items did not achieve consensus in the educator panel but achieved consensus in the student panel, educators may perceive that educational management is not directly relevant to their teaching role while students may want to know how university policy (e.g. a budget cut) impacts their study and future career. In this situation, educators, at least, need to have a basic understanding of the educational system and the nature of dental practice in their own country in order to clarify this issue to students. Hence, it probably implies that students expect their educators not only to be able to teach and support their learning but also to provide career-related guidance to them.

Within Topic 2, only half of the items in the educator panel achieved consensus for inclusion and one item in the student panel (large group teaching) achieved consensus for exclusion. This was the only item to achieve this form of consensus among all 51 items across both educator and student panels. Each of the items is discussed in turn in the next chapters.

One important finding of this study is that 9 out of 10 items (educator panel) and all items (student panel) under the 'Professionalism' topic achieved consensus. The finding is consistent with previous studies indicating that effective educators need both educational competences and characteristics of good educational professionals (Paukert and Richards 2000; Hesketh et al. 2001). The results confirm that professionalism is as important as educational theories and practices for being an effective educator.

According to the role of a dental educator as a researcher – Topic 8 – no item in the educator panel and only one item in the student panel achieved consensus. It is relevant to note that because approximately 25% of educators who participated in this study were part-time educators whose academic role mainly involves teaching or supervision in clinical practice. Part-time clinical educators might perceive that they are the end-users of educational research which means learning how to do educational research is not important and relevant to their job. For the student panel, students may have misunderstood the 'Educational Research' topic as dental-/clinical-related research, so they would expect their educators to possess important research skills in dentistry.

Items under the topics related to other roles of dental educators – administrators and healthcare providers (Topic 9 – 11) achieved greater consensus in the student panel than the educator panel. Educators might perceive that management, QA, and healthcare are not directly relevant to the teaching role. In contrast, students might expect educators to be competent in other roles which support the teaching role.

In summary, the initial results suggest that the educator-curriculum should emphasise the educational content which is primarily relevant to UG teaching and learning (core content): educational concepts, curriculum and evaluation,

and professionalism. Content on the topics of management, QA, and healthcare that relates to the teaching role also has to be integrated into the core content. Content which relates to other roles of dental educators can be provided as optional or advanced modules because they are context-dependent subjects. The basic principles of educational research are important for understanding and applying educational concepts to real practice. However, completing an educational project may only be necessary for a curriculum at the Master or Doctoral level.

Concerning the demographic information, there were statistically significant differences amongst the opinions of participants in both educator panel (Table 7.9-7.11) and student panel (Table 7.12-7.14). Several significant differences are discussed in Chapter 8 and 9. Further details on the statistically significant difference of each item are represented in Appendix H and I.

Table 7.9 Statistically significant differences of the opinions amongst educators (Part 1).

Curriculum Topic	Educational Content	Gender	Age	Country Area	Teaching Experience	Academic Position	UG Teaching Proportion	Educational Environment
Educational Theories and Principles	1. Learning Theories				+			
	2. Learning Styles and Learning Approaches				+			M
	3. Learning Environment							
	4. Reflective Practice							
	5. Mentoring and Coaching							
	6. Contemporary Teaching and Learning Methods				+			M
	7. Educational Strategies and Processes							
Modes of Education	1. Large Group Teaching							
	2. Small Group Teaching							
	3. One-to-One Teaching				+			
	4. Teaching in the Clinical Setting							
	5. Outreach/Community Based/Workplace-Based Teaching							M
	6. Inter-/Multi-professional Teaching							
Learner's Issues	1. Learner's Problems and Difficulties							
	2. Support for Learners							M
	3. Learners with Special Needs							
Educational Materials and Instructional Design	1. Learning Resources, Educational Media and Materials							
	2. Instructional Design							

+ = $p<0.05$; ++ = $p<0.005$; M = There is one or more statistically difference were found (see Appendix H)

Table 7.10 Statistically significant differences of the opinions amongst educators (Part 2).

Curriculum Topic	Educational Content	Gender	Age	Country Area	Teaching Experience	Academic Position	UG Teaching Proportion	Educational Environment
Assessment and Feedback	1. Assessment Principles		+		+			
	2. Assessment Methods and Instruments		++		++			
	3. Performance Assessment				+			
	4. Self-Assessment				+			
	5. Feedback							
	6. Assessment Calibration							M
Curriculum	1. Curriculum Development							
	2. Curriculum Implementation							
	3. Programme and Course Development							
Evaluation	1. Evaluation of Educational Programmes							
	2. Teacher and Teaching Evaluation							
Educational Research	1. Educational Research and Methods							
	2. Research Components and Processes							
Educational Management	1. Educational System and Dental Education							
	2. Management and Organisation Principles in Dental Education		+					
	3. Leadership and Teamwork							
	4. Educational Change							
	5. Student Recruitment and Admission							M
Quality Assurance	1. Principles of Audit, Quality, Standards and QA							
	2. Local/National QA and Regulatory Bodies							
	3. QA Implementation and Development							

+ = $p<0.05$; ++ = $p<0.005$; M = There is one or more statistically difference were found (see Appendix H)

Table 7.11 Statistically significant differences of the opinions amongst educators (Part 3).

Curriculum Topic	Educational Content	Gender	Age	Country Area	Teaching Experience	Academic Position	UG Teaching Proportion	Educational Environment
Patient Care and Health Care System	1. Health Care System and Management							M
	2. Health Care Quality and Standards							M
Professionalism	1. Professional Ethics and Behaviour			+				
	2. Professionalism Development							
	3. Personal and Professional Skills: Content Knowledge and Expertise	+						
	4. Personal and Professional Skills: Clinical and Technical Skills							M
	5. Personal and Professional Skills: Evidence-Based Practice							M
	6. Personal and Professional Skills: Evidence-Based Education							M
	7. Personal and Professional Skills: Communication and Interpersonal Skills							
	8. Personal and Professional Skills: Personal Management Skills							
	9. Personal and Professional Skills: Career Skills							
	10. Personal and Professional Skills: Personal and Professional Development							

+ = $p<0.05$; ++ = $p<0.005$; M = There is one or more statistically difference were found (see Appendix H)

Supachai Chuenjitwongsa   Chapter 7

Table 7.12 Statistically significant differences of the opinions amongst students (Part 1).

Curriculum Topic	Educational Content	Gender	Age	Country Area	Year of Study	Educational Environment
Educational Theories and Principles	1. Learning Theories 2. Learning Styles and Learning Approaches 3. Learning Environment 4. Reflective Practice 5. Mentoring and Coaching 6. Contemporary Teaching and Learning Methods 7. Educational Strategies and Processes					M
Modes of Education	1. Large Group Teaching			+		
	2. Small Group Teaching					
	3. One-to-One Teaching				+	
	4. Teaching in the Clinical Setting			+	+	
	5. Outreach/Community Based/Workplace-Based Teaching			+	+	
	6. Inter-/Multi-professional Teaching				+	
Learner's Issues	1. Learner's Problems and Difficulties					
	2. Support for Learners					
	3. Learners with Special Needs					
Educational Materials and Instructional Design	1. Learning Resources, Educational Media and Materials					
	2. Instructional Design					

+ = p<0.05; ++ = p<0.005; M = There is one or more statistically difference were found (see Appendix I)

Table 7.13 Statistically significant differences of the opinions amongst students (Part 2).

Curriculum Topic	Educational Content	Gender	Age	Country Area	Year of Study	Educational Environment
Assessment and Feedback	1. Assessment Principles					
	2. Assessment Methods and Instruments					M
	3. Performance Assessment			+		M
	4. Self-Assessment					
	5. Feedback			+		
	6. Assessment Calibration					
Curriculum	1. Curriculum Development					
	2. Curriculum Implementation					M
	3. Programme and Course Development					
Evaluation	1. Evaluation of Educational Programmes					
	2. Teacher and Teaching Evaluation					
Educational Research	1. Educational Research and Methods			+		
	2. Research Components and Processes					
Educational Management	1. Educational System and Dental Education			+		
	2. Management and Organisation Principles in Dental Education					
	3. Leadership and Teamwork					
	4. Educational Change					
	5. Student Recruitment and Admission					
Quality Assurance	1. Principles of Audit, Quality, Standards and QA					
	2. Local/National QA and Regulatory Bodies					
	3. QA Implementation and Development					

+ = p<0.05; ++ = p<0.005; M = There is one or more statistically difference were found (see Appendix I)

Table 7.14 Statistically significant differences of the opinions amongst students (Part 3).

Curriculum Topic	Educational Content	Gender	Age	Country Area	Year of Study	Educational Environment
Patient Care and Health Care System	1. Health Care System and Management					
	2. Health Care Quality and Standards			+		
Professionalism	1. Professional Ethics and Behaviour			++		
	2. Professionalism Development					
	3. Personal and Professional Skills: Content Knowledge and Expertise					
	4. Personal and Professional Skills: Clinical and Technical Skills					
	5. Personal and Professional Skills: Evidence-Based Practice					
	6. Personal and Professional Skills: Evidence-Based Education					M
	7. Personal and Professional Skills: Communication and Interpersonal Skills					
	8. Personal and Professional Skills: Personal Management Skills					
	9. Personal and Professional Skills: Career Skills					
	10. Personal and Professional Skills: Personal and Professional Development					

+ = p<0.05; ++ = p<0.005; M = There is one or more statistically difference were found (see Appendix I)

7.4 Data Verification

The aim of the data verification process were to validate the curriculum content (study results), to gain acceptability from a wider audience, and to improve the overall applicability of the curriculum content. The questionnaire was completed by educators and students at two European conferences (ADEE and EDSA). Demographic information of respondents is represented in Table 7.15 and 7.16.

Most respondents' demographic information from the data verification process was analogous to information from the main study. It suggests that the results are valid and trustworthy because the nature of respondents was similar.

Table 7.15 Demographic information of the data verification process (educator panel).

Information		Number	
Number of Participants		21	
Gender	Male	8	38%
	Female	12	57%
	N/A	1	5%
Age	26 – 35	1	5%
	36 – 45	3	14%
	46 – 55	12	57%
	56 – 65	3	14%
	Over 65	1	5%
	N/A	1	5%
Country	Eastern Europe	-	-
	Northern Europe	14	67%
	Southern Europe	4	19%
	Western Europe	2	9%
	N/A	1	5%
Teaching Experience	Up to 5 years	1	5%
	Between 6 and 12 years	4	19%
	13 years and over	15	71%
	N/A	1	5%
Academic Position	Full-time	16	76%
	Part-time	4	19%
	N/A	1	5%
Proportion of the job which involves teaching undergraduate students	Up to 20 %	5	24%
	21 – 40 %	4	19%
	41 – 60 %	2	9%
	61 – 80 %	3	14%
	More than 80 %	6	29%
	N/A	1	5%
Educational Environment which the participants have been involved or experienced	Classroom-Based	17	81%
	Laboratory-Based	12	57%
	Clinical-Based	18	86%
	Outreach/Community/Workplace-Based	8	38%
	Other	3	14%

Table 7.16 Demographic information of the data verification process (student panel).

Information		Number	
Number of Participants		12	
Gender	Male	4	33%
	Female	8	64%
Age	Below 21	12	100%
	21 – 30	-	-
Country	Eastern Europe	3	25%
	Northern Europe	3	25%
	Southern Europe	4	33%
	Western Europe	-	-
	N/A	2	14%
Year of Study	First Year	1	8%
	Second Year	1	8%
	Third Year	2	17%
	Fourth Year	3	25%
	Fifth Year	4	34%
	N/A	1	8%
Educational Environment which the participants have been involved or experienced	Classroom-Based	10	84%
	Laboratory-Based	6	50%
	Clinical-Based	12	100%
	Outreach/Community/Workplace-Based	3	25%
	Other	2	17%

A draft of the educator-curriculum content was developed using the final results from the main study. This was presented as core and optional content. After the questionnaire for data verification was administered and analysed, it was found that most educators (86%) and all students agreed that the core content is important and needs to be included in the educator-curriculum (Table 7.17).

In contrast, there were differing opinions on the optional content. The majority of students (83%) agreed that the items in this group were not important for inclusion in the educator-curriculum. However, two-thirds of educators perceived that the items in optional content were important and should be moved to the core content. This indicates the controversial issues within the optional content. Further discussion is provided in Chapter 9.

This result is consistent with the findings from the main study. The consensus items achieved a high level of agreement in both educator and student panels and the data verification confirmed that they are essential. These items can be considered as fundamental content which all educators should learn and be competent in for teaching an UG-curriculum. As for the non-consensus items they did not achieve consensus in both Delphi rounds of the educator panel. This indicates that the importance of non-consensus items may be influenced by other factors such as local context.

In conclusion, the general results of this study suggest that an educator-curriculum should consist of two categories: core content which all educators should be competent in and optional content which can be tailored to local needs.

Table 7.17 The results from data verification.

The Data Verification						
Question			**Educator**		**Student**	
Do you agree that all these items in the "core content" are important?	Agree	18	86%	12	100%	
	Disagree	3	14%	-	-	
According to the "optional content", do you agree that all these items are not core items to be included in a curriculum for educators?	Agree	7	33%	10	83%	
	Disagree	14	67%	2	17%	

Core Content		
➢ Reflective Practice ➢ Teaching in the Clinical Setting ➢ Feedback ➢ Small Group Teaching ➢ Performance Assessment ➢ Mentoring and Coaching ➢ Self-Assessment ➢ Learner's Problems and Difficulties ➢ Support for Learners ➢ Evidence-Based Clinical Practice ➢ One-to-One Teaching ➢ Assessment Calibration ➢ Learning Styles and Learning Approaches ➢ Learning Environment	➢ Assessment Methods and Instruments ➢ Learning Resources, Educational Media and Materials ➢ Educational Strategies and Processes ➢ Evidence-Based Education ➢ Assessment Principles ➢ Contemporary Teaching and Learning Methods ➢ Learning Theories ➢ Instructional Design ➢ Programme and Course Development ➢ Teacher and Teaching Evaluation ➢ Evaluation of Educational Programmes	➢ Leadership and Teamwork ➢ Curriculum Implementation ➢ Curriculum Development ➢ Health Care Quality and Standards ➢ Principles of Audit, Quality, Standards, QA ➢ QA Implementation and Development ➢ Professional Ethics and Behaviour ➢ Professionalism Development ➢ Communication and Interpersonal Skills ➢ Content Knowledge and Expertise ➢ Clinical and Technical Skills ➢ Personal and Professional Development ➢ Personal Management Skills

Optional Content		
➢ Inter-/Multi-professional Teaching ➢ Career Guidance Skills ➢ Outreach/Community/Workplace-Based Teaching ➢ Learners with Special Needs ➢ Large Group Teaching	➢ Educational Research and Methods ➢ Research Components and Processes ➢ Local/National QA and Regulatory Bodies ➢ Health Care System and Management	➢ Educational Change ➢ Educational System and Dental Education ➢ Student Recruitment and Admission ➢ Management and Organisation Principles in Dental Education

7.5 The Educator-Curriculum

All 51 items were re-categorised using the general finding from data verification (i.e. the educator-curriculum comprises core and optional content) and previous literature (as discussed in Chapter 3 and 4) as a framework.

Teaching in clinical environments is an important part of UG-DentEd of which educators must also be competent. Furthermore, in order to provide effective teaching, educators need to know, not only how to teach, but also why they teach using educational principles that underpin and enhance clinical teaching (McLeod et al. 2003). An educator-curriculum content needs to emphasise educational principles of teaching clinical dentistry and the application of these principles in a real teaching context. The former provides pedagogical knowledge which informs teaching practice in both clinical and non-clinical settings. The latter helps educators to provide effective teaching that allows students to develop professional competences.

UG-DentEd covers three main components: CBC, institutional issues, and external factors (see Chapter 2) with which educators are regularly involved as a part of their career. In addition to the teaching role, other roles of educators (research, administration, healthcare) can also impact teaching, learning, and student development (Bligh and Brice 2009; Strauss et al. 2010). Educators themselves could strongly influence students' learning and professional development (Paukert and Richards 2000; Elzubeir and Rizk 2001). This implies that competence in research, administration, healthcare and desirable attributes of educators are also essential for the teaching role. The educator-curriculum should cover, in addition to teaching and learning, key aspects of other roles of educators which influence teaching roles, and also highlight the importance of how to be a good teacher. Therefore, it is possible to define a training (curriculum content) for dental educators into:

'why' of teaching; 'how' of teaching; educational competences relating to research, administration, and healthcare roles; and how to be effective dental educators.

As a result of this study, the proposed educator-curriculum consists of seven domains. The term 'domain' in this study represents 'a broad category of educational competence for European dental educators'. Domains 1-4 contain all consensus items of the educator panel, the fundamental content of the educator-curriculum in which all educators should be competent. In contrast, Domains 5-7 comprise non-consensus items of the educator panel, the optional content which can be tailored to local needs.

Domain 1 focuses on the educational foundation of effective teaching in UG-DentEd, the 'why' of teaching. Domain 2 concentrates on practical aspects of teaching and learning in UG-DentEd (i.e. how to teach). Domain 3 includes content related to the big picture of dental education and other roles of educators which are necessary for UG teaching. Domain 4 represents educational professionalism and characteristics of a good teacher. Domain 5 contains educational content relating to 'why' and 'how' of teaching which is context-dependent. Domain 6 comprises competences in educational research. Finally, domain 7 indicates competences in organisation and healthcare management.

Chapter 8 provides in-depth discussion on the core content (Domains 1-4) while Chapter 9 represents the optional content (Domains 5-7) in detail.

Chapter 8 The Core Curriculum Content

This chapter outlines the core curriculum content of the educator-curriculum (Domains 1-4). It also includes results from quantitative and qualitative analyses relating to specific parts of the curriculum content. The results from the student panel are also presented for data comparison and discussion. Quotes from respondents used in this chapter are labelled and can be referenced back to the original source. The meaning of the label is shown in Table 8.1.

Table 8.1 Explanation of the codes for quotes from respondents.

Code Format	(Theme/Respondent/Geographical Area)	
Theme	Refer to the original quote located in the qualitative analysis (Appendix L). E.g. T1 indicates that the quote located in Theme 1. Theme is not available for quotes from the data verification of both educator and student panels.	
Respondent	Refer to the respondent who provided the quote. E.g. S22 is the student number 22 from the first round, E05-2 is the educator number 5 from the second round.	E = Educator S = Student P = Student – Supplementary VE = Educator – Data Verification VS = Student – Data Verification VX = Educator – Data Verification (with incomplete response)
Geographical Area	Refer to the European area in which the respondent located.	E-Europe = Eastern Europe S-Europe = Southern Europe N-Europe = Northern Europe W-Europe = Western Europe
Example	(T10/E22-2/S-Europe)	The quote is in Theme 10. It was provided by educator number 22 in the second round. The respondent was from Southern Europe.
	(VX8/N-Europe)	The quote is in the data verification result (educator). It was provided by educator number 8 who did not response to some parts of the questionnaire. The educator was from Northern Europe.

8.1 Domain 1 Educational Principles

This domain covers the educational basis of learning and teaching in UG-DentalEduc. Results from educator and student panels are shown in Table 8.2.

With regard to educational principles, two major topics are discussed in the literature: (1) teaching and learning issues and (2) assessment (Hesketh et al. 2001; Hand 2006; Harris et al. 2007; Srinivasan et al. 2011; COPDEND 2013a). This grouping is used to re-categorise the consensus items and frame the structure of Domain 1. Educational content is separated into two topics: principles of teaching and learning and principles of assessment. The items were sorted based on the level of consensus in the educator panel.

Most items in this domain achieved a very high level of consensus (> 90%) in both educator and student panels. This suggests that items in this domain are fundamental for educators pursuing teaching roles. The result is consistent with previous studies that also showed principles related to teaching and learning are perceived as important in any teacher training programme (Hand 2006; Molenaar et al. 2009). However, two items in the student panel – 'Learning Environment' and 'Assessment Calibration' – did not achieve consensus. Nevertheless, the level of consensus of these two items was still high (>85%); it is possible to classify these items as consensus for inclusion because the level of consensus is arbitrary and depends on a study and research context (Powell 2003). Therefore, it was decided to treat all items in this domain as consensus items for inclusion.

Table 8.2 Educational content and results for Domain 1: Educational Principles.

Educational Content	Educator			Student			Significant Difference (Mann-Whitney U test) α = 0.05
	%	Mean	Result	%	Mean	Result	
Topic 1.1 **Principles of Teaching and Learning**							
1. Learning Styles and Learning Approaches	96	3.6	CI	84	3.3	CI	p=0.031
2. Learning Resources, Educational Media and Materials	94	3.6	CI	87	3.4	CI	p=0.044
3. Learning Environment	94	3.3	CI	88	3.1	NC	-
4. Educational Strategies and Processes	92	3.5	CI	94	3.5	CI	-
5. Evidence-Based Education	92	3.4	CI	92	3.4	CI	-
6. Contemporary Teaching and Learning Methods	91	3.5	CI	87	3.4	CI	-
7. Learning Theories	91	3.4	CI	94	3.5	CI	-
8. Instructional Design	91	3.3	CI	88	3.2	CI	-
Topic 1.2 **Principles of Assessment**							
9. Assessment Calibration	100	3.6	CI	87	3.1	NC	p=0.008
10. Assessment Methods and Instruments	94	3.6	CI	92	3.3	CI	p=0.008
11. Assessment Principles	91	3.6	CI	94	3.3	CI	p=0.033

% = Percentage of participants who rated 3 or 4 (i.e. level of consensus)   CI = Consensus (Including)   NC = Non-Consensus

8.1.1 Principles of Teaching and Learning

This topic covers fundamental principles and theories of teaching and learning in UG-DentalEduc. Educational content included in this topic are learning styles and approaches; learning resources, educational media and materials; learning environment; educational strategies and processes; evidence-based education; contemporary teaching and learning methods; learning theories; and instructional design.

8.1.1.1 Learning Styles and Approaches

Students utilise different learning styles and approaches to develop and cope with learning. This probably implies that students may develop their own strategies to cope with teaching methods which do not fully match with their

learning styles and approaches. Recently teaching methods have shifted toward a more student-centred approach, a variety of educational strategies focusing on this approach have been introduced into UG curricula (e.g. PBL, SDL) (Haden et al. 2006; Oliver et al. 2008). There have been attempts to provide a number of different educational methods to suit different learning styles of students. However, not all educational strategies can match up with all student learning styles/approaches and not all students may benefit from the current teaching methods provided in the UG-curriculum. Additionally, the ways students learn depend on their cultural background (see Chapter 5). Educators need to observe and help students to develop appropriate learning styles and approaches which they can effectively use during the UG-curriculum. The educator-curriculum needs to highlight this notion so that educators will be able to provide appropriate teaching adapted to students' learning preferences.

According to the study results, the level of consensus of 'Learning Styles and Learning Approaches' in the educator panel was significantly higher than the student panel (p-value = 0.031). If their learning style is fixed, students can only adjust their learning approach to cope with learning in an UG-curriculum. Consequently, they may not be aware of the importance and influence of learning styles toward their own learning. On the other hand, educators might realise that utilising appropriate teaching methods matched to students learning preference could lead to effective learning. One educator also commented in a similar vein, *"… by understanding better how students learn, the curriculum and educational approach can be adjusted to improve learning"* (T1/E18/N-Europe). This suggests that the understanding of learning styles and approaches are not only essential for effective teaching and learning but also beneficial to the curriculum level.

8.1.1.2 Teaching Styles and Approaches

In addition to how students learn, another issue related to teaching and learning is how educators teach. One educator pointed out, *"Each teacher has to develop his/her own personal ways to teach, but he/she needs a good theoretical basis to develop his/her own style"* (T1/E01/N-Europe). As for the personal teaching styles, the key message is students have different learning styles and can develop different approaches toward learning and development; therefore, educators need to develop their teaching styles and approaches to match student learning styles and approaches.

Regardless of the terminology both teaching styles and teaching approaches relate to how educators perceive learning, educational strategies which educators provide to students, and teaching behaviours (see Chapter 4). This may indicate that educators can adapt their own teaching to support students or to suit the educational environment. Arguably, if educators have sufficient background knowledge in educational principles, they should be able to provide a variety of teaching styles and approaches to support students' different learning styles and approaches. Teaching styles and approaches can be perceived as the practical aspect of teaching instead of the theoretical aspect. This supports the comment of the educator above that educators need good teaching/learning theories to develop their teaching styles.

8.1.1.3 Learning Theories

There are a plethora of educational theories on teaching and learning in health professional education (see Chapter 4). In this study, the term 'Learning Theories' used in the questionnaire was very broad. This term could not give a specific recommendation for what is necessary for educators to learn because it covers a wide-range of theories. However, the level of consensus was very high in both educator and student panels suggesting that the educational basis for teaching in UG-DentalEduc covers many areas,

thereby, promoting the need for educators to develop knowledge in learning theories.

One educator commented, *"My experience tells me that clinicians are not fully aware of these concepts"* (T1-E15/N-Europe). Further, a quarter of educators are part-time and 60% of educators in this study were involved in clinically-based teaching (Chapter 7 Table 7.4). These educators might not perceive that the theoretical basis of teaching is as essential as clinical expertise and experience. However, although experience and expertise allow educators to develop teaching skills and how to teach, it cannot provide full insight on why to teach a specific way or how an educational strategy can support student learning. Understanding the educational rationale of how to teach could be more beneficial as educators would be able to utilise theories to underpin and maximise teaching effectiveness and efficiency in support of student learning. The above comment suggests that clinical educators still require development in the area of learning theories.

8.1.1.4 Contemporary Teaching and Learning Methods

One educator pointed out, *"Contemporary Learning Methods vary from time to time, it is good to be aware of them, but they cannot be the only guideline"* (T1/E01/N-Europe). This suggests that educators should not jump on bandwagons and apply an educational strategy without considering its benefits for student learning.

The results showed that contemporary teaching and learning methods achieved a high level of consensus in both educator and student panels. This is consistent with previous literature that states a number of educational methods have been developed in the health professional education arena (e.g. portfolio, case-based learning, PBL) (Sefton 2004; Bassir et al. 2014).

Educators need to know what these methods are and also their advantages and disadvantages for student learning (Hesketh et al. 2001; McLeod et al. 2003). However, one educational method may not be beneficial in every education context (see Chapter 5). An example of this notion is problem-based learning (PBL) which is widely used in medical and dental education.

PBL provided advantages for student learning in several dental schools (Rohlin et al. 1998; Fincham and Shuler 2001; Haghparast et al. 2007). Educators should know how to use these methods to improve student learning (McLeod et al. 2003). However, students in some contexts (e.g. LPD countries) are struggling with developing learning and essential skills through PBL or other relevant methods (Biggs 1996b; Hussain et al. 2007).

When constructing techniques from the literature to support effective teaching, educators should realise that each educational method may contain cultural biases which promote success or failure within a specific context or culture. Rather than follow the crowd and utilise only a single educational method, educators should be aware of a variety of teaching and learning methods and be able to select the methods which are congruent with culture and context so as to help students to learn and develop professional competence.

8.1.1.5 Evidence-Based Education

Although a plethora of learning theories have been developed, not all theories might be beneficial in teaching and learning within UG-DentalEduc. One educator noted that dental education does not yet reflect the changes in the profession. Dental education requires a good theoretical basis.

"Dentistry/medicine will change dramatically within the next 10 years but our approaches to these changes are not reflected in our education. Therefore the education per se has to be very good and needs to have a sound basis." (T1/E29/W-Europe)

In addition to the understanding of a variety of learning theories, educators need to know which theories work or do not work in their own teaching context. Educators have to be able to analyse educational evidence and best practice so as to inform their teaching and support students (Hand 2006; COPDEND 2013a). Further, teaching and learning are influenced by local cultures, norms, and beliefs (Kember 2000; Hofstede et al. 2010), it should not be generalised that educational strategies which work effectively in one context will always provide a similar result in another context. Teaching should be culturally relevant with respect to student backgrounds (Ladson-Billings 1995). Providing and adapting teaching based on sound evidence is essential to support this notion. Educators should also understand and be able to practice evidence-based education regularly in their teaching roles.

8.1.1.6 Technology-Enhanced Learning and Educational Resources

TEL covers a wide-range of technological methods/tools that are beneficial for learning in several aspects (see Chapter 4). However, one student raised an important concern, *"Up-to-date teaching using new technology is seldom found"* (T1/P6/W-Europe). This reflects two recent issues in UG-DentalEduc. First, educators may not yet be fully aware of the technology used in dental education, although TEL and other technology tools (e.g. mobile apps) have been already used in dentistry (Schleyer et al. 2012; Khatoon et al. 2013). The other issue is an institution may not have the facilities to support the use of TEL. This is because UG-DentalEduc requires a large amount of resources and funding (Nash and Brown 2012) and many dental schools are facing financial challenges (Bailit et al. 2008). Employing TEL might create

further financial constraint to the dental schools or might not be a good cost-effective investment. Additionally, although TEL could support professional development, it may not fully replace traditional teaching (Divaris et al. 2008).

The above suggests that educators need to be aware of teaching using new technology and balance the use of traditional teaching and technology in order to effectively support student learning. Educational strategies using TEL can differ from traditional teaching, so educators need to understand how to utilise appropriate technology which are relevant to the teaching methods they currently use.

There is no doubt that TEL demands high support and resources and involvement from stakeholders (Mattheos et al. 2008), although arguably some learning/professional-related mobile apps are cheap. Other teaching methods also need sufficient and appropriate resources to make them effective for student learning. It was stated by one educator, *"For effective self-directed learning a good access to learning resources is essential"* (T4/E01/N-Europe). As learning can occur anywhere and anytime and possibly through technological devices, learning resources (e.g. textbooks, journals) need to be available for students to access and use in their learning. Even in classroom-based teaching, students need learning resources to gather information, perform group activity, and learn (Crosby 1996). However, one educator raised a problem with the lack of learning resources/materials for students.

> *"There is an increasing gap between the amount, and quality, of teaching material available in dentistry, particularly in the pre-clinical subjects and the needs of teachers and students."* (T4/E05/N-Europe)

This situation probably happens because of the advances in dental knowledge and technology leading to a large amount of knowledge which students need to learn in an UG-curriculum. However, available resources within a dental school or the materials provided by educators are insufficient to cover the information that the student needs to learn. Regardless of the teaching methods and educational context, educators need to prepare and provide learning resources which are adequate for students' needs or, at least, to guide students on how to access appropriate learning resources.

8.1.1.7 Educational Environments

Students in this study raised the point that working in a real, positive environment is essential and important for successful learning. For example, *"A positive and happy environment is essential for success"* (T1/P5/N-Europe). The comment is consistent with the literature that a desirable learning environment from the student's viewpoint is directly relevant to the educational process (Divaris et al. 2008). In other words, to enhance learning, students require surroundings which make them feel encouraged to learn, promote positive feelings toward learning, and expose them to real, professional contexts. One educator said, *"The respectful atmosphere is more important than the technically and decoratively proper settings"* (T4/E01/N-Europe). Students learn best in a positive environment. Moreover, it can also infer that learning environments cover not only the educational process but also broader issues such as IT facilities and institutional infrastructure (Haden et al. 2006).

A positive learning environment throughout an UG-curriculum is essential for student learning as it was suggested that Learning environments should include both within and outside the traditional educational context in order to enable students learn and develop lifelong learning skills. The educator-curriculum needs to include content on how to create and maintain a positive learning environment for students.

8.1.2 Principles of Assessment

This topic is comprised of key issues related to assessment. There are three items in this topic: assessment calibration, assessment methods and instruments, and assessment principles. All of them achieved a very high level of consensus (>90%).

8.1.2.1 Assessment Calibration

The study results showed that the item 'Assessment Calibration' achieved 100% consensus in the educator panel. One educator also warned, *"Any programmes which do not include assessment calibration/standard open the door to subjectivity and therefore bias"* (T5/E45/N-Europe). This underscores the importance of assessment calibration as an essential issue which all educators need to be aware of. Assessment of competence is complex and susceptible to subjectivity and bias. For instance, it is not possible to observe competence directly but it can be inferred from performance (McMullan et al. 2003). However, it can be argued that when students are able to perform basic procedures (e.g. be able to fill a cavity), it does not mean they are competent (e.g. be able to restore a carious tooth efficiently and safely) because performance may not represent real, multifaceted competence (Cate et al. 2010; Khan and Ramachandran 2012). This notion could compromise the validity and reliability of the assessment. Educators need to gain awareness of problems with assessment in dentistry and the importance of assessment calibration set toward a total quality assessment.

One interesting finding concerns the item 'Assessment Calibration', which achieved a significantly lower level of consensus in the student panel (p-value = 0.008). Students may not be fully informed by educators or dental schools about the purposes and methods of assessment, and therefore might not be aware of subjectivity and bias in the assessment. Alternatively, students might only focus on the procedural skills and clinical outcomes rather than learning and educational achievement so subjectivity and bias in

assessment is not their primary concern. However, students are aware of assessment calibration and problems within assessment and are concerned about the quality of assessment provided by educators (Gerzina et al. 2005; Schönwetter et al. 2006; Singh et al. 2013). This section suggests that assessment calibration is essential for maintaining high quality assessment and it needs to be conveyed to students to ensure they will receive a fair assessment.

8.1.2.2 The Aim of Assessment

It was stated by an educator, *"Assessment drives learning and so the assessments must be in keeping with the learning approach"* (T5/E18/N-Europe). This comment is consistent with a notion that formative assessment has a positive influence on learning (Veloski et al. 2006; Moore and Durham 2011). Feedback from educators enables students to reconsider their performance or understanding and identify areas of improvement which lead to further learning and development (Wood 2010).

However, the nature of dentistry involves a large amount of scientific knowledge, professional skills and values (Haden et al. 2006; DePaola 2008). Summative assessment, inevitably, has to measure both content knowledge and professional competence. To allow students to develop learning, educators need to provide constructive feedback in addition to the summative assessment.

In short, the emphasis of assessment must fall on how to use assessment to enhance student learning and urging educators to provide constructive feedback in support of student learning (see Topic 8.2.2.2).

8.1.2.3 Psychometric Aspects of Assessment

A number of assessment tools have been developed and used in health professional education and are claimed to be effective for assessing student learning and competence (Chambers and Glassman 1997; Shumway and Harden 2003). However, one educator commented, *"Assessment methods and instruments may vary from topic to topic"* (T5/E01/N-Europe). This is true because different topics involve different learning domains (e.g. cognitive, psychomotor) (Albino et al. 2008) and at different levels (e.g. knows, knows how, shows how) (Pangaro and ten Cate 2013). As a result, different assessment methods can be used to measure student learning at the different domains and levels. Assessment methods used by educators need to be relevant to learning domains and levels. The assessment needs to be able to measure what it intends to measure. This is a key concept of assessment validity which is one of the psychometric aspects of assessment (Holmboe et al. 2010; Moore and Durham 2011).

However, it was said by an educator, *"I only recently understood very clearly how important valid assessment is. I am afraid that many assessments lack sufficient validity"* (T5/E44/N-Europe). Although educators know how to use different assessments, this might not assure that the methods they use are valid and reflect that students attain the desirable learning outcome or competence. The emphasis of assessment should be on how to use the methods with an understanding of the psychometric aspects of assessment. The issues of quality of assessment methods (e.g. strengths, weaknesses) have been reported (Shumway and Harden 2003; Albino et al. 2008). However, the principles that underpin the quality of assessment (e.g. validity, reliability) are seldom discussed. Thus, assessment methods might be used without sound educational basis. In the educator-curriculum, educators need to learn more about the basic principles of assessment (e.g. psychometric theory) and understand how the assessment methods work and be able to select the most appropriate, valid, and reliable methods to measure student learning and achievement.

8.1.2.4 Practicing Assessment

One educator suggested, *"Teachers have plenty to learn in all the aspects of assessment and this part of the education has to be large with practical exercises"* (T5/E01/N-Europe). Assessment in dental education includes not only paper-based methods but also skill- or performance-based. For the latter, there are many factors which influence the quality of the assessment (e.g. patients, resources, systems) (Holmboe et al. 2010; Pangaro and ten Cate 2013). There are also a number of assessment methods which can be used to measure practical skills or professional competence (Chambers and Glassman 1997; Shumway and Harden 2003; Albino et al. 2008). A limited understanding of assessment does not ensure that educators are able to appropriately use assessment methods in real settings.

Practical exercises would help educators to gain understanding and experience in assessment so as to maximise student learning and prevent failure in assessment caused by an educator's lack of competence in assessment (e.g. providing low quality and invalid assessment). Therefore, in the educator-curriculum, the topic of assessment needs to include opportunities for educators to practice the principles and methods used for student assessment.

8.1.3 Summary of domain 1

Domain 1 focuses on educational principles that inform effective teaching practice. Topics and key issues of this domain that have been discussed above are presented in the Table 8.3.

Table 8.3 Topics, content, and key issues in Domain 1.

Domain 1: Educational Principles	
Educational Content	**Recommended Key issues**
Topic 1.1	**Principles of Teaching and Learning**
▪ Learning Styles and Learning Approaches ▪ Learning Resources, Educational Media and Materials ▪ Learning Environment ▪ Educational Strategies and Processes ▪ Evidence-Based Education ▪ Contemporary Teaching and Learning Methods ▪ Learning Theories ▪ Instructional Design	▪ Providing teaching which is congruent with students' learning styles ▪ Helping students to develop appropriate learning approaches ▪ Providing a variety of teaching styles/approaches to support students' different learning styles and approaches ▪ Using educational theories to underpin and maximise teaching ▪ Using educational evidence to inform teaching ▪ Selecting teaching and learning methods which are congruent with a specific culture/context ▪ Using technology to enhance teaching and learning ▪ Preparing and provide learning resources to support learning ▪ Creating and providing positive learning environment within/outside the educational context
Topic 1.2	**Principles of Assessment**
▪ Assessment Calibration ▪ Assessment Methods and Instruments ▪ Assessment Principles	▪ Using assessment calibration to create fair assessment and improve the quality of assessment ▪ Basic principles of assessment (e.g. psychometric theory) ▪ Selecting appropriate and valid methods to measure student learning and achievement ▪ Using formative and summative assessment for helping students develop deep learning. ▪ Importance of feedback and how to provide constructive feedback to support student learning ▪ Selecting assessment methods in relation to learning domains and levels ▪ Opportunities for educators to gain competence in assessment via real teaching and assessment practice

8.2 Domain 2 Educational Practice in Dentistry

This domain represents practical aspects of teaching and learning in dentistry focusing on the UG level. Results from educator and student panels are shown in Table 8.4.

Regarding the structure of UG-DentalEduc (see Chapter 2), an UG-curriculum consists of input, process, and output/outcome. Process covers several aspects including teaching, learning, assessment, learning support, and educational environment. While Domain 1 concentrated on foundation principles, this domain focuses on practical aspects. The consensus items have been grouped into three topics: teaching strategies in dentistry, student learning strategies in dentistry, and learning support in dentistry.

In both educator and student panels, the level of consensus of most items in this domain was very high (>90%). This suggests that both panels agreed items in this domain are important for educators especially in clinical teaching. Two items in the student panel – 'Learner's Problems and Difficulties' and 'One-to-One Teaching' – did not achieve consensus because the mean values were below the pre-determined cut-off value of 3.2. However, similar to Domain 1, these items achieved a high level of consensus and can be considered items for inclusion.

Table 8.4 Educational content and results of Domain 2: Educational Practice in Dentistry.

Educational Content	Educator			Student			Significant Difference (Mann-Whitney U test) α = 0.05
	%	Mean	Result	%	Mean	Result	
Topic 2.1 Educator Teaching Strategies in Dentistry							
1. Teaching in the Clinical Setting	98	3.8	CI	97	3.7	CI	-
2. Small Group Teaching	98	3.7	CI	95	3.6	CI	-
3. Mentoring and Coaching	98	3.6	CI	92	3.6	CI	-
4. Evidence-Based Clinical Practice	86	3.4	CI	95	3.6	CI	-
5. One-to-One Teaching	79	3.3	CI	82	3.1	NC	-
Topic 2.2 Student Learning Strategies in Dentistry							
6. Reflective Practice	100	3.7	CI	95	3.6	CI	-
7. Feedback	98	3.8	CI	95	3.6	CI	p=0.037
8. Performance Assessment	98	3.7	CI	92	3.5	CI	-
9. Self-Assessment	98	3.6	CI	82	3.3	CI	p=0.025
Topic 2.3 Learning Support in Dentistry							
10. Learner's Problems and Difficulties	92	3.5	CI	82	3.1	NC	-
11. Support for Learners	92	3.4	CI	92	3.4	CI	-

% = Percentage of participants who rated 3 or 4 (i.e. level of consensus)   CI = Consensus (Including)   NC = Non-Consensus

8.2.1 Teaching Strategies in Dentistry

This topic highlights teaching strategies and practice in dentistry employed by educators. Five consensus items included in this topic are: teaching in the clinical setting, small group teaching, mentoring and coaching, evidence-based clinical practice, and one-to-one teaching. All items achieved a high level of consensus in both panels.

8.2.1.1 Teaching in the Clinical Setting

It was suggested by educators that teaching in the clinical setting is *"needed on most dental topics in which students need competence level of learning"* (T2/E01/N-Europe). In order to develop competence, students need to integrate foundation knowledge and skills into practice (Chambers 1993). It is

recognised that teaching in the clinical setting not only helps students gain professional competences but also encourages students to develop self-assessment, reflection, and communication skills (Fugill 2005; McMillan 2011). Within the clinical setting, students are both learners and practitioners at the same time; students need to develop professional competences as well as providing treatment to patients. This implies that students need to develop both professional competence and skills which are necessary for managing patients, healthcare, and colleagues. This notion is congruent with the concept of competence raised by Gruppen et al. (2012) which explains that competence can possibly cover the scope beyond normal professional practice such as management and leadership. Clinical teaching should allow students to develop professional competence and other broader skills.

Additionally, teaching in the clinical setting can provide students authentic learning environment which enable students to effectively develop learning and professional competence (Gerzina et al. 2005; Schönwetter et al. 2006). This notion was supported by a student in this study stating that *"It is important for students to be able to work in a reality environment"* (T2/S38/N-Europe). This possibly suggests that the educator-curriculum need to promote teaching and learning within a real professional environment.

8.2.1.2 Small Group Teaching

Regarding the review in Chapter 4, small group teaching can be employed as a part of teaching in the clinical setting when students finish their daily practice (debriefing) or after they complete the clinical rotation. Additionally, small group teaching can take place outside clinical environments (e.g. classroom, library) and is not a part of clinical teaching. The term 'Small Group Teaching' in this study covers sessions which occur both inside and outside the clinical setting. Both educators and students strongly agreed that small group teaching is essential (98% and 95% respectively). Although this teaching method may not provide opportunities for students to make direct

contact with patients like chairside teaching, the very high level of consensus indicates small group teaching is valuable and allows students to develop knowledge and skills which can be applied in clinical practice. It was mentioned that small group teaching is beneficial for reflective practice.

"I feel that small group teaching is preferable and results in a more reflective learning process." (T2/E08/N-Europe)

The key issue is that small group teaching allows students to develop the necessary skills for effective reflective practice and learning in clinical environments (see Chapter 4). It is consistent with previous studies that small group teaching is an issue that educators need to understand and be able to effectively provide to students (Hand 2006; Harris et al. 2007). The educator-curriculum should focus on how to encourage students to develop essential skills necessary for their professional career and practice through a small group session.

8.2.1.3 Supervision, Mentoring, and Coaching

It was raised by a student that mentoring in clinical practice is good for learning in dentistry.

"Practicing and having a mentor is the best way to learn dentistry." (T1/S39/S-Europe)

Teaching in dentistry (especially in a clinical setting) emphasises the unique role of educators as learning facilitators/mentors/supervisors rather than information providers. Also chairside teaching requires educators to guide and support individual students (see Topic 8.2.1.5). Educators need to know

how to guide and support student learning appropriately. Although the definitions of supervision, mentoring, and coaching are different, their core purpose is similar as they highlight educators as providing guidance and support to allow students to develop their own learning pace and performance (Launer 2010). This implies that these three terms are educational principles which educators need to provide to students especially in clinical practice. Several studies attest that an ability to provide good support and guidance (i.e. being a good mentor) is a desirable characteristic of effective educators (Molenaar et al. 2009; Srinivasan et al. 2011).

However, students at the UG level are not yet fully experienced or competent. In case of a mistake which violates patient safety, educators might need to get involved in the situation and provide direction to students for immediate problem solving. This requires an ability of educators to judge between when to provide support to enhance student learning during clinical practice and when to intervene and direct student learning and/or practice so as to solve a crisis. For the latter, educators must sometimes take over the management of a patient and the student then receives a practical demonstration of the appropriate clinical steps to complete the procedure. Educators need the skills to recognise a developing problem and be able to recover the situation. Moreover, they must endeavour to maintain the patient's confidence that the problem is being rectified and that the patient can maintain their trust in the student.

8.2.1.4 Evidence-Based Clinical Practice and Effective Teaching

In this study, although there was no significant difference in the level of consensus of the item 'Evidence-Based Clinical Practice' between educator and student panels, students rated this item as more important than educators did (i.e. higher percentage).

It is possible that students realised that evidence-based practice (EBP) provides them with effective and high quality practice or that they are expected to practice evidence-based dentistry. The latter is more likely to happen as students can learn how to provide best practice based on sound evidence; however, they may not be able to implement that practice due to the tacit component (see Chapter 4). As a result, they may just do what educators expect them to do without recognising the real benefits of EBP.

Educators might think that EBP is not necessary for their teaching role. One educator raised that:

> *"Evidence-based issues are rated lower than others because … EB issues are fashionable … [it] may not be very important to [the educator]!"* (T12/E01/N-Europe)

This could imply that educators do not believe in EBP, or that they have a more practical approach, realising that there is very little evidence for most of what dental professionals do. It seems educators perceived EBP was important only for the healthcare aspect but ignored its educational benefits for student learning. One educator commented that teaching students how to learn was important.

> *"In the era of evidence-based practice, and a world in which disease patterns, patient expectations, and materials and technology are changing almost daily it is much more important to teach people how to learn than to simply fill them with today's facts (50% of which will be proven to be wrong within 10 years)."* (T1/E45/N-Europe)

In an evidence-based process, students have opportunities to develop a variety of skills including knowledge acquisition, critical thinking, and problem solving (Straus et al. 2005). In order to support EBP, a combination of evidence-based knowledge and personal experience is essential to overcome the problem with tacit knowledge (Fugill 2012). While students lack clinical experience, educators can share their experience with students to be aware of the tacit components of practice. Educators need an understanding of evidence-based principles and processes in order to encourage and assist students to develop these essential skills. They also need to help students to apply evidence into practice through sharing clinical experience with students.

The emphasis of EBP in the educator-curriculum should be on guiding and supporting students to develop lifelong learning skills through the evidence-based process rather than teaching how to provide high-quality practice based on sound evidence. In other words, educators need to be able to teach students how to learn through EBP.

8.2.1.5 Chairside Teaching

In this study, the item 'One-to-One Teaching' – which primarily intended to represent the concept of chairside teaching and related issues (see Chapter 4) – surprisingly had the lowest level of consensus in Domain 1; although, it achieved consensus for inclusion and previous studies also report that one-to-one teaching is important for effective educators (Hand 2006; Harris et al. 2007). There are two possible reasons to explain this result. Firstly, the term one-to-one teaching is ambiguous as respondents might understand that it is a teaching method that only occurs outside clinical practice when students require personal tutoring. Secondly, respondents might perceive chairside teaching as a part of the item 'Teaching in the Clinical Setting', albeit information in the 'More Info' box of the questionnaire clearly stated that 'Chairside Teaching' is an item under the topic 'One-to-One Teaching' (see

Appendix D). Both reasons probably explain why 'Teaching in the Clinical Setting' had 98% consensus while 'One-to-One Teaching' achieved a 79% consensus level.

It is described in the literature that one-to-one teaching is a broader terminology that covers methods such as supervision, mentoring, and coaching (Launer 2010). However, one-to-one teaching in this research project mainly focuses on chairside teaching while mentoring and coaching is considered as a separate educational principle (see Topic 8.2.1.3).

For the item 'One-to-One Teaching', mature and experienced educators perceived this item as essential compared with early career educators (p-value = 0.025, Appendix H). Teaching and learning at the chairside can occur at any time during clinical practice, so experienced educators might be aware of this notion more than early career educators who might think that students can learn only after practice. In other words, experienced educators are aware of reflection-in-action as well as reflection-on-action while early career educators are familiar with only reflection-on-action. The above discussion suggests that chairside teaching is effective for teaching clinical dentistry as learning can be developed throughout the practice. Reflection-in-action can be beneficial for embracing tacit knowledge (Lyon 2014). The educator-curriculum should emphasise this notion.

8.2.2 Student Learning Strategies in Dentistry

This topic illustrates strategies students use to develop learning especially in clinical dentistry and include these four educational methods: reflective practice, feedback, performance assessment, and self-assessment. 'Reflective Practice' achieved the highest level of consensus, 100% in the educator panel and 95% in the student panel. The other three methods also achieved a high level of consensus from both panels.

8.2.2.1 Reflective Practice

It was stated by an educator that reflective practice is essential for students to develop deep learning:

"I highlight the reflective practice because teaching without the proper communication and dialogue between teacher and student does not lead to deep learning." (T1/E01/N-Europe)

It is consistent with previous studies that reflective practice is an issue that educators need to gain understanding in because it is an essential component of student learning (Wall and McAleer 2000; Hesketh et al. 2001; Bullock and Firmstone 2008). Reflective practice allows students to link new experience to their prior knowledge so as to develop learning and helps students to identify areas for improvement (Mann et al. 2009; Kaufman and Mann 2010).

While learning in dentistry involves tacit knowledge, reflective practice may help students to be aware of such knowledge. Additionally, the nature of dental practice, students need to apply their knowledge, skills, and professional values in a flexible manner to solve problems in different scenarios. If one characteristic of a competent practitioner is to solve professional problems in different contexts (Chambers 1993), reflective practice is an effective tool for students to develop deep learning and apply knowledge in other contexts.

The above discussion implies that it is necessary for the educator-curriculum to help educators understand and be able to assist students with utilising reflective practice regularly and effectively to enhance and develop learning. It should emphasise providing opportunities for student to re-consider their

practice in order to identify good performance as well as areas of further development. This needs to be done with educators providing constructive feedback to support student learning. Finally, the educator-curriculum also should focus on helping students use reflective practice to make them aware of tacit knowledge.

8.2.2.2 Self-Assessment and Feedback

Both educators and students acknowledged that self-assessment and feedback are essential as they allow students to recognise their mistakes and improve learning.

> *"Students need to understand what they have done wrong to improve on their own work. Without feedback assessments which end in failure for the student are demoralising as they may not understand what they have done wrong."* (T5/S37/N-Europe)

In order to perform reflective practice, students need to be able to assess their performance and practice outcomes. This can lead them to explore further learning issues, problems, and how to improve their performance. Although there is no robust evidence to suggest that self-assessment can improve student learning or clinical outcome (see Chapter 4), it could be argued that self-assessment is an important part of reflective practice in order to understand new experiences, identify areas of improvement, and develop learning

Regarding the item 'Self-Assessment', educators significantly perceived this item as more important than students (p=0.025). This possibly reflects that students might think self-assessment is just a part of their practice and/or assessment process which they need to perform for passing an exam or

completing requirements. When their workload is high and demanding, students might not realise the purpose and benefits of self-assessment. This situation could compromise student learning and development. Consequently, educators should be able to help students develop self-assessment skills and to demonstrate how self-assessment can be beneficial for student learning and further professional practice (i.e. develop a positive attitude toward self-assessment).

Feedback from educators is another important issue that supports reflective practice and self-assessment as it provides guidance and information that students can use for their learning and development (Mann et al. 2009; Sandars 2009). The level of consensus for the item 'Feedback' rated by students from Northern Europe was significantly higher than by students from Southern Europe (p-value = 0.005, Appendix I). Feedback requires clear communication between students and educators; hence, this process may be effective for students from Northern Europe as they have a SPD cultural background that enables them to feel comfortable to express opinions and discuss them with educators (Hofstede et al. 2010). In contrast, students from Southern Europe, whose cultural background is LPD and constrained, might not benefit from feedback as they are uncomfortable with confrontation and open discussions with educators (Hofstede 2011). They might have their own ways of dealing with learning and development issues with which they are familiar, so they would not perceive that feedback is very important for them. Additionally, in the above situation, students will benefit from feedback only when educators directly focus on what students have done well and what needs improvement. It is suggested that good feedback should avoid prejudice and criticism and be specific to the performance rather than the person (Wood 2010).

However, the level of consensus of the item 'Feedback' as a whole in the student panel was very high (95%). This indicates that feedback is still

essential for students but there needs to be appropriate strategies for giving feedback to students from LPD and constrained cultural backgrounds. Educators still need to be able to provide constructive feedback to support student learning; however, educators need to be aware that feedback should be given in the way which is congruent with the student's cultural background.

8.2.2.3 Performance Assessment

It was mentioned by an educator that performance assessment needs to be *"honest, but respectful and discrete especially in the situation when something went wrong"* (T5/E01/N-Europe). Several studies also suggest that educators need to provide effective performance assessment to support development of student competence (Hesketh et al. 2001; McLeod et al. 2003). Performance assessment is a type of judgement and feedback provided by educators. Educators need to be able to recognise and assess students' good/poor performance to provide useful, constructive feedback that supports self-assessment and reflective practice (see Chapter 4). For educators to recognise good or poor performance they must be present with students to observe it. There should be an adequate number of educators available in a clinical session to have time to assess student performance and provide constructive feedback.

However, several dental schools are facing a shortage of clinical educators and an increasing number of dental students (Martin et al. 2010). Previous studies revealed that, in the UK, sometimes the educator-per-student ratio is very low – 1:12 in clinical practice (Clark et al. 2010) or 1:22 in a laboratory (Lynch and Allen 2007). While an optimum educator-per-student ratio in teaching dentistry has not yet been suggested in the literature, these results could reflect that educators have insufficient time to assess student performance and provide effective feedback to students because each educator needs to supervise a large number of students per clinical session.

Students probably also waste their time waiting for educators. To solve this problem, both administration and policy-makers need to be involved which is beyond the focus of this study. Instead, in this study, the above problem suggests that the item 'Performance Assessment' needs to focus on how to provide time-effective performance assessment to students (i.e. educators should provide assessment and feedback within a limited time but that is still beneficial for students).

The comment from the educator above might also suggest that when educators spot any poor performance, the feedback they give to students should aim to improve student performance and help students to solve problems rather than criticising their performance. This also requires educators to be honest on student assessment (Bush et al. 2013). In light of the above, performance assessment in the educator-curriculum could usefully focus on actual performance, correcting mistakes, aiming for improvement, and supporting student learning.

8.2.3 Learning Support in Dentistry

In order for students to perform reflective practice, develop learning in clinical practice, and attain competence, they need appropriate support from educators for their learning and development. From the teaching side, support is an important factor for successful one-to-one and small group teaching sessions. This topic includes two consensus items related to the issue of support: 'Learner's Problems and Difficulties' and 'Support for Learners'.

8.2.3.1 Learner Differences

The item 'Learner's Problems and Difficulties' achieved a very high level of consensus in the educator panel (>90%). It indicates this issue is essential and educators need to recognise it. The issues of learning difficulties and

support have been raised in previous literature that highlight factors which cause learning problems (see Chapter 4). However, not all students require support for their learning and the literature does not clearly define which group of students need or will benefit from this support.

This research study demonstrates the issue of learner differences. Students can be categorised into three groups based on their need for support.

> *"Instead of speaking of learners' problems I would stress learners' differences. That is the issue we need to stress, and also teachers differences. In the post-modern society 'the difference' is a value itself and we need to take this into account in teaching and find ways to deal with the difference even if we need to give good education to all of the students. To our experience about one third of students need support, in addition, one third would benefit of it and one third can manage on their own easily."* (T3/E01/N-Europe)

These differences arise as Europe was formed by diverse people, cultures, and traditions. In an UG-curriculum, students may come from different cultural backgrounds with differing perceptions and responses toward teaching and learning. In the UK, for example, previously the majority of dental students were male of white ethnicity whose cultural backgrounds were SPD (Small Power Distance) and Individualist. Recently the number of female students and students from Asian and other European backgrounds which are LPD (Large Power Distance) and Collectivist is gradually increasing (Higher Education Statistics Agency 2014). While Western white students learn through questioning and group discussion, Eastern European and Asian students prefer to learning via receiving instruction from educators (Hofstede et al. 2010). Thus students from different backgrounds require different levels of support to achieve their learning goals.

Additionally, UG-DentalEduc has been developed toward a student-centred approach. This principle may act against the nature of Eastern European and Asian students and create stressful learning environments and discomfort, and may compromise their learning or lead to learning problems and difficulties. In this situation, students would strongly require support and educators should give more attention to students to prevent or solve students' problems. It is essential that educators are aware of learners' cultural differences and be able to deal with diversity in dental education. This issue also relates to the concept of cultural competence (see Chapter 5). Educators need to be able to adapt and employ a variety of educational strategies to ensure that students from different cultural backgrounds can benefit from. This should be a focal point of this issue within the educator-curriculum. However, educators need to be aware that personal factors (e.g. intellectual capacity, practical capability) might also relate to learner differences as well as cultural factors.

8.2.3.2 Support for Students

According to three groups of students mentioned by an educator in the previous topic, educators need to be aware that not all students need support. For the last group of students who can manage their own problems, it could be that these students are able to access or understand how to utilise available support to develop learning and competence. Support can be used for either assisting student learning and development or helping students to overcome their learning difficulties. For the second group, students may need further development, may be struggling with learning, or may initially experience learning difficulties. Appropriate support could allow them to expand knowledge and skills or manage their difficulties to continue learning. For the first group who really need support, they might experience advanced problems or difficulties which compromise their learning and/or personal life. Support is essential for them to overcome the problems and prevent further problems from occurring.

Benefits of support for students include improving learning and developing professional competence (O'Neill and McMahon 2005; Ramani and Leinster 2008) and helping students to overcome learning difficulties (Dent and Harden 2013). Regardless of student needs, support has to be provided and available throughout the UG-curriculum (Manogue et al. 2011). This will allow students to access and receive support whenever they need it.

It is important for educators to be able to identify students who need support and be able to assist these students. Quite often these students believe that they should be able to sort out their own problems (i.e. they believe they are high achievers) and go into a spiral of decline which is only noticed when they have a crisis. It can be difficult to identify these problems if the students will not share their concerns. The benefits of helping students who require support have been weighted by one educator who remarked, *"We are obliged to help with such problems [i.e. learners' problems and difficulties] and doing so has given us much positive feedback"* (T3/E05/N-Europe). This suggests that support is an important factor for effective learning in dentistry; the educator should have a compulsory role in providing support to students. However it must be acknowledged that such support is resource intensive, and may have a negative impact on other students who also require support.

In this study, clinical educators rated the item 'Support for Learners' higher than educators who were not involved in clinical teaching (p-value = 0.010, Appendix H). Clinical educators might realise that clinical practice involves patient safety, complex procedures, and a high standard of performance. This environment is very stressful for students and educators so students need support for academic, performance and practical issues. In contrast, a classroom-based environment does not involve patient or clinical procedures, so students may require only academic support from educators. Non-clinical educators might not perceive the importance of support in a clinical aspect.

However, learning can occur in any educational context. Support should be available for students throughout the UG-curriculum and in any educational context. One student also mentioned a similar issue, *"If a student is struggling with something, it is important that there is support in place to help them through dental school"* (T3/P5/N-Europe). This notion re-affirms that support needs to be sufficient for students during the UG-curriculum.

Although providing support is possibly a task for all educators, it was argued that the issue of student psychological difficulties and support could be managed by someone who is specially trained in this area rather than being a task for all educators.

> *"I do not think that every teacher has to be an expert in this. As someone else already stated, a specially trained person could take care of this."* (T3/E27-2/N-Europe)

It is quite reasonable that not all educators need to deal with students who have serious problems or difficulties. For these students, appropriate procedures and experts in this area are required. However, support for students covers not only a process for helping students with difficulties but also providing academic and learning support throughout the UG-curriculum (e.g. routine support and feedback in clinical practice). If one third of students benefit from support and another one third (who can cope with difficulties by themselves) also need to access available support when they need it, then it possibly implies that all educators who are involved in UG-DentalEduc should be able to provide appropriate support to encourage student learning and prevent learning difficulties and problems.

The results of the Delphi indicate that the topic of student difficulties and support should be included in the educator-curriculum. The content could cover basic principles that are relevant to educators' teaching role and their

routine tasks. When more in-depth support is needed by students, a specific group of educators can be further trained to mainly deal with student difficulties and problems or counsellors with an insight into the demands of dental education can be brought in.

8.2.4 Summary of Domain 2

Domain 2 focuses on practical aspects of teaching and learning in dentistry. Topics and key issues of this domain that have been discussed above are presented in the Table 8.5.

Table 8.5 Topics, content, and key issues in Domain 2.

Domain 2: Educational Practice in Dentistry	
Educational Content	**Recommended Key issues**
Topic 2.1	**Educator Teaching Strategies in Dentistry**
• Teaching in the Clinical Setting • Small Group Teaching • Mentoring and Coaching • Evidence-Based Clinical Practice • One-to-One Teaching	• Helping students to develop professional competences and other essential skills in the clinical setting • Using small group teaching to encourage students to develop essential skills necessary for their professional career and practice • Understanding when to intervene or give additional support to students • An ability to recover situations caused by poor performance, clinical failure, or other unforeseen circumstances • Understanding evidence-based principles and processes • Sharing experience with students about applying evidence into practice • Guiding and supporting students to develop lifelong learning skills through the evidence-based process • Understanding chairside teaching and using reflection-in-action to support students
Topic 2.2	**Student Learning Strategies in Dentistry**
• Reflective Practice • Feedback • Performance Assessment • Self-Assessment	• Understanding and assisting student to use reflective practice to develop learning • Helping students use reflective practice to make sense of tacit knowledge in dentistry • Helping students develop self-assessment skills and positive attitudes toward self-assessment • Providing constructive and culturally-congruent feedback to support student learning • Using immediate feedback to help students understand tacit knowledge • How to recognise and assess student's good/bad performance
Topic 2.3	**Learning Support in Dentistry**
• Learner's Problems and Difficulties • Support for Learners	• Understanding learners' differences and cultural diversity • Developing and utilising culturally-appropriate educational strategies • How to identify students who need support and providing appropriate support to students

8.3 Domain 3 Curriculum, Quality, and Improvement

This domain covers issues related to curriculum, evaluation, and educational quality. Results from educator and student panels are shown in Table 8.6.

All items in this domain achieved consensus (inclusion) in both panels. The level of consensus in the student panel was noticeably higher than in the educator panel. Educators have different roles and their careers involve different parts of dental education so they might perceive these items as not directly related to their teaching role. In contrast, students might expect their educators to be competent in this domain as well as to be competent in their teaching role (e.g. delivering a high quality learning experience). Students might have a lack of experience in educational matters (e.g. educational theories) and insight of careers which involve teaching roles; they assumed that all items were important regardless of a correct understanding of the items in this domain.

The item 'Healthcare Quality and Standards', for instance, could exemplify this notion as all students (100%) agreed that the item is essential. This probably is rooted in the nature of UG-DentalEduc where students spend most of their time in clinical practice in order to develop competence and are taught to achieve a standard of excellence. Clinical procedures and practice outcomes, inevitably, are of the primary concerns to students; although, one might argue that other personal aspects including professional behaviours and communication are also essential for developing professional competences (Chambers 1998). Accordingly, students expect their educators to understand healthcare quality and standards so as to provide feedback on their practice and support their learning and development. Educators, however, might see this issue as one part of clinical teaching and the whole UG-curriculum. For effective teaching, from an educators' viewpoint, educational principles and how to teach (Domains 1 and 2) may be more

desirable than healthcare quality and standards. However, this study suggests that issues related to curriculum, quality and improvement are essential for teaching roles and they need more consideration from educators (see Topic 8.3.1-8.3.2).

The item 'Leadership and Teamwork' achieved a high level of consensus in both panels. It is asserted that leadership is a key issue for successful curriculum development and implementation (Oliver et al. 2008) and successful quality improvement (Haden et al. 2006). This suggests that leadership is also an essential topic which educators need to develop through the educator-curriculum as they are fundamental for curriculum and quality issues (see Topic 8.3.1-8.3.2).

Regarding the above discussion, consensus items relating to curriculum, evaluation, quality, and leadership can be categorised into three major topics: curriculum; evaluation, quality and standards; and leadership.

Table 8.6 Educational content and results for Domain 3: Curriculum, Quality, and Improvement.

Educational Content	Educator			Student			Significant Difference (Mann-Whitney U test) α = 0.05
	%	Mean	Result	%	Mean	Result	
Topic 3.1 Curriculum							
1. Programme and Course Development	96	3.6	CI	92	3.6	CI	-
2. Curriculum Implementation	87	3.2	CI	92	3.4	CI	-
3. Curriculum Development	83	3.3	CI	90	3.5	CI	-
Topic 3.2 Evaluation, Quality and Standards							
4. Teacher and Teaching Evaluation	92	3.6	CI	95	3.5	CI	-
5. Evaluation of Educational Programmes	88	3.6	CI	95	3.4	CI	-
6. Health Care Quality and Standards	79	3.2	CI	100	3.7	CI	p=0.001
7. Principles of Audit, Quality, Standards and QA	77	3.2	CI	94	3.5	CI	-
8. QA Implementation and Development	75	3.2	CI	94	3.6	CI	-
Topic 3.3 Leadership and Teamwork							
9. Leadership and Teamwork	87	3.3	CI	82	3.2	CI	-

% = Percentage of participants who rated 3 or 4 (i.e. level of consensus)   CI = Consensus (Including)

8.3.1 Curriculum

The focus of this topic is curriculum development and implementation and includes three items: programme and course development, curriculum implementation, and curriculum development.

8.3.1.1 Understanding the UG-Curriculum

It was raised by an educator, *"The principles of the curriculum need to point to teachers, the importance of curriculum improvements and the ways to do it"* (T6/E01/N-Europe). It is important for educators to understand a curriculum as it impacts on student learning and development (Harden and Crosby 2000). For instance, it is asserted that a curriculum can help

educators to understand what is taught and why as a part of the whole educational system (Hesketh et al. 2001). Indeed, understanding how an UG-curriculum is developed helps educators to realise the educational goal and adjust their courses and educational processes (i.e. teaching, learning, assessment) to be consistent with the curriculum. One student commented that:

> *"Education is changing quickly with new technology e.g. e-lecture and computer programmes, and to keep up with these interactive methods the curriculum should always be revised and kept up-to-date."*
> (T6/S38/N-Europe)

High quality teaching directly relates to how the curriculum is developed. If educators understand the whole picture of the curriculum and their contributions to the curriculum, they can help students learn and develop competence toward the expected learning outcome for practitioners. Educators need knowledge of the curriculum so as to improve quality of education.

8.3.2 Evaluation, Quality, and Standards

This topic concerns assessing the quality of teachers, teaching and educational programmes, as well as, standards and other factors related to education. The aim of this topic is to help educators understand how these issues are essential for maintaining and improving the quality of teaching and the UG-curriculum. This topic covers the following consensus items: teacher and teaching evaluation; evaluation of educational programmes; healthcare quality and standards; principles of audit, quality, standards, and QA; and QA implementation and development.

8.3.2.1 The Focus of Evaluation

As one participant commented, *"Like assessment for learners, evaluation is essential for teachers and institutions to develop further in their field"* (T7/E08/N-Europe). The aim of evaluation is to make a value judgement on an educational programme and its components (e.g. teaching) (Wall 2010). The importance of evaluation has been presented and articulated in the literature (see Chapter 4). Evaluation is an essential process not only for educators to improve the quality of the educational provisions but also for institutions to consider tenure, career promotion, and pay rises of their educational staff (Centra 1994; Chen and Hoshower 2003).

Generally, evaluation of an UG-curriculum tends to focus on the input and process of the curriculum (e.g. reviewing if the intended outcomes are appropriate and were achieved) (Goldie 2006; Harden and Laidlaw 2012). It is also possible to evaluate other aspects of the UG-curriculum (e.g. educational contexts) using an evaluation model such as the CIPP model (see Chapter 4). This model is feasible and practical and also provides rigorous results which effectively inform further educational programme development (Durning et al. 2007). However, one might argue that if one aim of dental education is to provide competent and independent dentists to serve society (Chambers 1998), evaluation should focus more on educational outcome or the achievement of students within the UG-curriculum.

One educator recommended *"The evaluation should focus more on how well the students have fulfilled the aims and objectives of the programme/topic have than on persons involved in teaching"* (T7/E01/N-Europe). This possibly means that good results in teaching evaluation may not always reflect that students can develop good learning because they reflect a different perspective. For example, educators can effectively utilise educational resources and provide interactive learning strategies but students may not learn efficiently because those methods do not match student learning styles.

This suggests that an ability to evaluate their own teaching to improve teaching quality is still essential for educators; however, the main emphasis of evaluation needs to focus on student achievement as a better indicator of the quality of teaching.

Regarding Kirkpatrick's outcome evaluation model (see Chapter 4), if an outcome of the UG-curriculum is competent dental graduates who work for a society, then the outcome evaluation needs to aim at the last two levels: performance (e.g. how well the graduates perform as professional practitioners) and outcome (e.g. the improvement of community oral health status). Feedback from society, stakeholders, and patients who are the end-users of graduates (the outcome of the curriculum) are required as data input for the evaluation (Frye and Hemmer 2012). However, it was stated by an educator that this issue has not yet been recognised.

> *"Evaluation of the Education Programmes should not be made within the Dental School alone. The views of the community officials, community dentists and other oral health professionals, physicians and patients need to be considered. This type of evaluation is essential."* (T7/E01/N-Europe)

It suggests that the involvement of end-users and stakeholders in teaching and curriculum evaluation is essential and further research is still needed. In the educator-curriculum, this issue needs to be emphasised.

One could argue that not all educators are involved in the programme evaluation process, although it is beneficial for them to understand what the process is and how the result can be used for improvement. It is important to gain positive attitude toward evaluation to enhance teaching quality.

Educators also require a broad knowledge of evaluation, evaluation models, and how to use evaluation as a tool for improving quality of teaching and the UG-curriculum. This issue should be a focus of the topic evaluation in the educator-curriculum.

8.3.2.2 Evaluation and Quality Improvement

It was mentioned that evaluation is essential for the quality assurance process.

"[Evaluation and related issues] are also essential if we want to answer the health needs of the surrounding population (i.e. objectives of our teaching and curriculum) and if we implement a quality assurance process." (T7/E13/W-Europe)

This is consistent with the literature that shows evaluation is an important process for quality issues as it demonstrates not only how well the teaching was delivered and the curriculum was implemented (Hobson et al. 2008), but also can be used to reflect on how dental education helps to prepare dentists to meet the population oral healthcare needs (see more discussion in Topic 8.3.2.3). However, it was raised that evaluation has not been fully and appropriately utilised and it is *"variable, uncontrolled and based on saving money rather than improving quality"* (T7/E05/N-Europe). This suggests that educators and institutions still need to be aware of the importance and benefits of evaluation toward the quality of UG-DentalEduc and need to realise that evaluation is essential for everyone to support quality improvement and meeting the population oral healthcare needs.

8.3.2.3 Importance of Quality Issues

It was raised that quality issues, especially QA, are essential for dental education as it *"gives the solid base for all our education and makes it comparable with others"* (T10/E08-2/N-Europe). The purposes of QA are to ensure that education and its components (e.g. curriculum, teaching/learning) are accountable and transparent, to provide high quality outcomes to serve societal needs, and to meet international standards and recognition (Lagrosen et al. 2004; Hobson et al. 2008). Since Europe has been moving towards convergence of HE curricula, it is important for all educational programmes to demonstrate that they have comparable quality in order to facilitate freedom of movement and promote the whole educational quality of Europe (EHEA 2005). The comment above reminds the dental professional that QA is important and helps professionals to achieve the European goal.

Although evaluation and QA are intertwined, they focus on different perspectives which are complementary. While evaluation provides value judgement on recent performance and status of a curriculum, QA comprises activities and procedures to ensure that the curriculum achieves or fulfils the standards (i.e. requirements of a good curriculum) (Hobson et al. 2008). Indeed, evaluation points out the gaps between current status and standards or the areas of improvement while QA helps fill in the gaps and shapes the development of an UG-curriculum in the right direction. Educators need to be aware of QA and its benefits toward the curriculum and their own teaching.

It was suggested, *"Official quality control would be desirable, but good quality should also be the goal of any individual who is involved in education"* (T10/E08/N-Europe). This urges educators to continuously develop and improve their teaching because it contributes toward the overall quality of the UG-curriculum. In the educator-curriculum, the topic of quality needs to focus on how quality issues inform and assist educational improvement. Educators

should develop knowledge and competence in quality and educational improvement.

According to one participant, in some European countries it is a requirement for educators to have an understanding of quality assurance and related issues:

> *"At least in Germany a lot of professionals who teach in university have to take exams from their students. For this they are appointed by regulatory bodies. So it is essential to have profound knowledge about quality ..."* (T10/E27-2/W-Europe)

This comment underscores the need for knowledge in quality issues. However, there is lack of evidence suggesting that QA is an essential topic for developing educators. One possible reason is the topic is not directly related to teaching roles. QA might be misperceived as additional work or a burden for educators which consumes much time but does not provide any educational benefit or productivity; the benefits of QA are devalued. Helping educators gain positive attitudes toward quality issue and QA is important before educators can champion these topics.

8.3.2.4 Standards of Practice and Effective Teaching

UG dental students are learning to become a part of the healthcare profession. It was suggested by an educator, *"Students need to develop within a programme that makes them aware of all aspects of quality in healthcare"* (T11/E18/N-Europe). Normally, student clinical procedures and outcomes will be assessed against standards of practice (GDC 2011). Clinical educators not only have to focus on developing student learning but also need to maintain the quality of healthcare and clinical outcomes. In this

sense, the item 'Healthcare Quality and Standards' in this study directly refers to standards of practice in dentistry. Yet there is a lack of evidence that shows that standards of practice are important in and relevant to developing educators.

In this study, students rated the item 'Healthcare Quality and Standards' very highly and statistically differently to educators (p-value = 0.001). Students are at the centre of teaching and learning in clinical dentistry, so it is inevitable that using standards of practice to maintain quality of clinical outcomes must influence student learning. Students need to develop and utilise professional knowledge, skills, and attitudes for high quality practice. Students probably realised this notion and felt that healthcare quality and standards are important for educators who can help them develop both learning and practice. However, it seems that educators have not yet recognised this issue can inform teaching and learning. The emphasis of this topic in the educator-curriculum needs to highlight how healthcare quality and standards inform teaching, especially in clinical dentistry, and how it helps students learn and maintain quality in practice.

8.3.3 Leadership and Teamwork

This topic outlines the importance of leadership and teamwork on curriculum development, educational improvement, and student learning.

The study's results reveal that the item 'Leadership and Teamwork' is essential for educators as it achieved high level of consensus (>80%) in both educator and student panels. In this discussion, the term 'leadership' is used to represent this item. One educator commented that this item is required for all educators.

"To be able to work in teams and to manipulate changes in education is a necessary ability that all dental educators should have, regardless whether they occupy administrative and managerial positions or not."
(T9/E22-2/S-Europe)

It is coherent with the literature that leadership and teamwork are an important skill which educators need to possess (Bullock and Firmstone 2008; Molenaar et al. 2009). In dental education, good leadership is required for: creating clinical governance (i.e. a system for maintaining and improving quality of patient care), dealing with change and development, solving institutional problems (e.g. financial problems, workforces), developing positive environments within an institution, and securing the future of profession (Albino 1999; Roth 2007; Townsend et al. 2008).

However, it was perceived that *"… lack of good leadership is currently one major issue in dentistry"* (T9/E01/N-Europe). This problem possibly stems from dentistry being a profession in which a practice normally does not involve a large number of employees. Although one might argue that dental professionals, including dentists, dental nurses, hygienists, therapists, and technicians, usually work as a team; this is a relatively small group compared to a team of staff members in some business sectors. Additionally, although in Europe (and other regions) the published documents for competences of dental graduates have already defined leadership as important (Sanz et al. 2008; Cowpe et al. 2010), in practice, it is still difficult to embed this topic into an UG-curriculum. Students may lack the opportunity to learn and develop leadership skills as they spend most of their time (especially at the preclinical stage) developing psychomotor and procedural skills in a dental laboratory. Further, there is a lack of evidence on the result of leadership skills development in dental students. This issue suggests that leadership training at the UG level is needed for general dental practice. Recently, in UK for example, 'management and leadership' has been included as a core

competence of the Dental Foundation Training (DFT) (COPDEND 2013b). It mainly focuses on managing and leading in a hospital and healthcare contexts. However, from the dental education perspective, being fully trained for clinical and healthcare contexts may not imply that dentists will be able to manage and lead a team in educational contexts because of the different nature of the works and environments.

As a result, when dentists pursue an academic career, they might not be able to effectively lead or work as part of a team due to their strong independence, or lack of leadership development during their training. In the academic arena, leadership can evolve gradually as individuals gain seniority. Ultimately they may become the Dean of their school, or the chair/president of a professional body. This sort of leadership requires considerable political skill and is completely different from running a practice. Thus, academics have a different view of leadership to that required by the UG who will end up as a general practitioner. This can explain why leadership problems still persist in dental education (Certosimo 2010). Arguably, leadership in dentistry is an urgent issue that negatively impacts on dental education as a whole; the educator-curriculum needs to focus on developing leadership skills related to educational contexts in order to help solve this issue.

One student raised an interesting point about leadership that *"To teach students how to lead is important"* (T9/S39/S-Europe). This comment suggests that educators need leadership skills not only for working as a part of dental education team, but also for developing these skills within students. Dental students are the future of our profession; it can be argued that if we need dental professionals who are able to lead dental education, we need to start from educating and developing leadership skills in our dental students. The focus of the educator-curriculum also needs to cover how to teach and develop leadership skills to students.

8.3.4 Summary of Domain 3

Domain 3 focuses on educational knowledge and competence related to the institutional level. Topics and key issues of this domain that have been discussed above are presented in the Table 8.7.

Table 8.7 Topics, content, and key issues in Domain 3.

Domain 3: Curriculum, Quality, and Improvement	
Educational Content	**Recommended Key issues**
Topic 3.1	**Curriculum**
• Programme and Course Development • Curriculum Development • Curriculum Implementation	• Principles of outcome-based education, curriculum, curriculum development and implementation • How to arrange the educational process to be congruent with the curriculum • How curriculum inform effective teaching and learning
Topic 3.2	**Evaluation, Quality and Standards**
• Teacher and Teaching Evaluation • Evaluation of Educational Programmes • Principles of Audit, Quality, Standards, and QA • QA Implementation and Development • Healthcare Quality and Standards	• Importance, purposes and focuses of evaluation • How to evaluate teaching and student achievement • How to gain involvement from stakeholders toward the evaluation process • Evaluation models and how to use evaluation as a tool for improving quality of teaching and an UG-curriculum • Understanding quality assurance and related issues for developing and improving quality of teaching • How to gain awareness of and positive perception toward quality assurance • Using healthcare standards to inform teaching and maintaining practice quality in clinical teaching
Topic 3.3	**Leadership and Teamwork**
• Leadership and Teamwork	• Leadership skills relating to teaching roles and dental education contexts • How to develop leadership skills in students

8.4 Domain 4 Educational Professionalism

This domain concerns the professionalism of educators (Table 8.8). All items in this domain achieved very high level of consensus (more than 80%) amongst educators and students. This suggests that these items definitely need to be included in the educator-curriculum.

Table 8.8 Educational content and results of Domain 4: Educational Professionalism.

Educational Content	Educator			Student			Significant Difference (Mann-Whitney U test) $\alpha = 0.05$
	%	Mean	Result	%	Mean	Result	
Topic 4.1 Ethics and Professional Characteristics							
1. Professional Ethics and Behaviour	96	3.8	CI	97	3.6	CI	-
2. Professionalism Development	94	3.6	CI	92	3.6	CI	-
3. Communication and Interpersonal Skills	92	3.6	CI	97	3.5	CI	-
4. Personal Management Skills	85	3.3	CI	84	3.2	CI	-
5. Personal and Professional Development	85	3.3	CI	97	3.6	CI	-
Topic 4.2 Knowledge and Expertise							
6. Content Knowledge and Expertise	90	3.4	CI	92	3.5	CI	-
7. Clinical and Technical Skills	89	3.4	CI	100	3.9	CI	p=0.001

% = Percentage of participants who rated 3 or 4 (i.e. level of consensus)   CI = Consensus (Including)

The results also show that students generally valued this domain more highly than educators. One possible explanation is that educators have other roles and responsibilities, in addition to the teaching role. They need to balance their roles to achieve their career goals. Educators who also have other roles, part-time practitioners or university researchers for instance, may not

concern themselves with educational professionalism, although it can be argued that it is essential for anyone who gets involved in teaching roles. Regardless of roles and responsibilities, educators in this study agreed that educational professionalism is important for UG teaching as can be seen from the high level of consensus. Another reason could be that educational professionalism mainly relates to personal attributes which are subjective (e.g. enthusiasm, approachability – see Chapter 4). Educators might perceive that these characteristics cannot be taught explicitly; they can be developed from experience throughout the educational career.

Students also agreed that this domain is very important for educators because students expect their educators to be good 'role models' who demonstrate professional and ethical behaviours and possess essential knowledge and skills in order to support students' learning and development. It is found that in clinical practice, students can learn from their educators unconsciously through observation and imitation of the educators' behaviours (Fugill 2012); this suggests that educators need to be good role models. It is coherent with previous studies that educators as good role models are essential for supporting student learning in clinical settings (Paukert and Richards 2000; Buchel and Edwards 2005). Although educational professionalism covers a range of issues, role modelling is probably a fundamental part of educational professionalism which the educator-curriculum needs to highlight.

Educational professionalism (and characteristics of good educators), according to the literature, cover a variety of issues (see Chapter 4). However, in this study, consensus items relating to educational professionalism can be categorised into two topics: ethics and professional characteristics, and knowledge and expertise. The first topic focuses on characteristics of good educators which is consistent with the literature. The

second topic discusses how educators' discipline knowledge, skills, and expertise inform teaching.

8.4.1 Ethics and Professional Characteristics

This topic highlights the importance of educational professionalism, ethics, and behaviour which educators need to possess and apply to their teaching. Five items: professional ethics and behaviour, professionalism development, communication and interpersonal skills, personal management skills, and personal and professional development are included in this topic.

8.4.1.1 Being a Good Teacher

Dental educators are an important part of the concerns as they can demonstrate 'educational professionalism' and be good role models to help students developing desirable professional attitudes and behaviours. They can create positive educational environments within UG-DentalEduc in order to maintain the value of education and professionalism in dentistry.

It was also mentioned that *"If teachers are not competent in professionalism, what hope is there for the students!"* (T12/E33/N-Europe). This notion strongly suggests that if UG-DentalEduc aims to provide competent and 'ethical' dentists to serve a society, it should begin with developing professionalism and ethics in educators in order to be good role models to support students developing professionalism. One student commented that, *"The goal should always be to make the students the best at what they are educating themselves to be"* (T12/S23/N-Europe). This implies that to achieve the aim of UG-DentalEduc, education itself should stress 'how to be a good professional'.

Students expect educators to be both good practitioners and teachers (Paukert and Richards 2000; Elzubeir and Rizk 2001). Educators themselves also need to be aware of professional ethics regarding educational contexts (DfE 2011). The above examples indicate that being a good teacher and the understanding of professional issues related to education are fundamental for educators. Hopefully, this could provide indirect influences on students' academic and professional development. This is congruent with the earlier discussion that professionalism can be seen from two aspects: dental professionalism (i.e. educators as good dental practitioners) and educational professionalism (i.e. educators as good teachers). The former helps educators to support students develop dental professional attributes while the latter enable educators to enhance student learning and development. The educator-curriculum needs to focus on both educational and dental professionalism.

8.4.1.2 Personal and Interpersonal Skills

Two items – 'Communication and Interpersonal Skills' and 'Personal Management Skills' – achieved a high level of consensus. Although none of the participants in this study commented on these two items, the result is still coherent with the literature. Several characteristics of educators such as communication, positive interaction, and personal efficiency (i.e. good work-life balance) are key attributes of effective educators that students need from their educators (Paukert and Richards 2000; Elzubeir and Rizk 2001). This is especially true for communication, which influences teaching and learning in several environments. For example, for clinical teaching, communication is an important part of developing rapport and providing constructive feedback (Ramani and Leinster 2008). In small group teaching, in order to enhance group dynamic and learning both students and educators need good communication and interpersonal skills (McCrorie 2010).

Regarding the item 'Personal and Professional Development' which achieved a high level of consensus in both panels (>85%), the point was raised that *"It is important for educators to continue their professional development for the best possible teaching"* (T1/S23/N-Europe). There are two relevant aspects to professional development. First, educators need to maintain their educational competence in order to maintain good teaching (see discussion in Domain 2). Second, educators also need to develop discipline-based knowledge and skills in order to teach in a particular topic. The literature indicated that educators need to maintain and improve their knowledge and skills in both educational and disciplinary aspects (Hesketh et al. 2001; Hand 2006). Educators need to keep their knowledge and expertise up to date for improving their teaching; these issues are fundamental for the educator-curriculum.

8.4.2 Knowledge and Expertise

This topic focuses on the importance of disciplinary knowledge and expertise and how they inform high quality teaching and learning in dental education. Two items are included in this topic: content knowledge and expertise, and clinical and technical skills.

8.4.2.1 Content Experts vs Process Experts

In this study, the item 'Content Knowledge and Expertise' achieved a high level of consensus in both educator and student panels. It suggests that educators need to be content experts to support student learning. Educators as content experts are beneficial in several aspects including supporting in-depth discussion in a specific issue, helping students to understand new information and develop higher-ordered thinking skills, and providing a good source of knowledge to support deep learning (see Chapter 4). It is possible that content experts (who are also competent educators) will realise that students may need only a portion of their specialist knowledge; they know what that proportion should be and know how to support students to acquire

that knowledge. For this notion, educators need to have specific content knowledge in order to plan an appropriate learning session and support group discussion and help students to gain in-depth understanding of a learning issue. They also can show students a broad horizon of knowledge which allows students to gain interest and appreciation in the subject.

The issue of educators as content experts has been challenged by several academics. De Grave et al. (1999) found that students prefer facilitators to be process experts who can support their learning in a group rather than being content experts who provide direct information to them. It is asserted that educators also need to have good facilitator skills to encourage group activities and collaborative learning (Chan 2008). Teaching staff in a group should focus on group dynamic, activities, and learning by facilitating, encouraging and motivating the whole group to develop collaborative learning and achieve learning goals (Khan and Coomarasamy 2006). For this notion, educational competences related to facilitating learning (i.e. competences for being process experts) are essential.

The above discussion reflects that students can develop learning by themselves (through information and support from content experts) and from other students (via group activities). The constructivism learning theory clarifies that learning can be developed within the individuals (i.e. radical constructivism) or from others (i.e. social constructivism) (Karagiorgi and Symeou 2005). From this, content expertise is important for radical constructivism and process expertise is critical for social constructivism. This notion is consistent with the finding in this study that how to apply content knowledge and expertise to inform teaching and support student learning (Domain 4) and educational principles bases of student-centred learning and support for students (Domains 1 and 2) are essential and need to be included in the educator-curriculum.

8.4.2.2 Clinical Skills and Students Learning

Students rated the item 'Clinical and Technical Skills' as the most important item of the educator-curriculum (100%). Also, students perceived this item as essential significantly more than educators (p=0.001). Educators probably realised that clinical dentistry involves a number of factors including clinical outcome, education, patient welfare where clinical skills are just a factor of successful clinical teaching and learning. In contrast, students were in the process of developing skills and competence for their future career, so they might worry about clinical skills and practice outcomes more than learning aspects. They expected their educators to possess good clinical and technical skills to support their practice.

Moreover, although dental education has been moving toward competency-based assessment and a number of assessment tools have been invented and applied continuously (see Chapter 4), not all educators are aware of this. Their teaching still relies on their clinical knowledge, expertise, and educational methods that were used to teach them – which are mainly teacher-centred and do not necessarily provide students with lifelong learning skills. This probably embeds the perception in students that clinical skills and practice outcomes are the primary concern in clinical teaching and learning.

Another issue is that giving too much emphasis to clinical skills and outcomes can compromise the knowledge and professional values aspects of the competence. It may not ensure that students who provide high quality clinical outcomes are competent and possess sufficient knowledge and attributes of a good dental practitioner. However, the advantage of clinical skills on teaching and learning should not be ignored. For instance, when any failure happens in practice, good clinical skills allow educators to deal with a clinical problem appropriately, prevent an injury to patients, and protect students from legal problems emerging from mistakes or malpractice. For this reason, educators need to know not only how to teach, but also have

knowledge and skills related to the subject or clinical procedure being taught. This study suggests that clinical skills are as essential as educational competence.

8.4.3 Summary of Domain 4

Domain 4 focuses on educational professionalism and characteristics of good educators. Topics and key issues of this domain that have been discussed above are presented in the Table 8.9.

Table 8.9 Topics, content, and key issues in Domain 4.

Domain 4: Educational Professionalism	
Educational Content	**Recommended Key issues**
Topic 4.1	**Ethics and Professional Characteristics**
▪ Professional Ethics and Behaviour ▪ Professionalism Development ▪ Communication and Interpersonal Skills ▪ Personal Management Skills ▪ Personal and Professional Development	▪ Characteristics and attributes of a good teacher that can effectively support student learning and development ▪ Understanding professional issues relating to education ▪ Being a good role model ▪ How to demonstrate and apply professionalism into the real professional context ▪ Effective communication skills for teaching and helping students learn ▪ How to maintain and improve knowledge and expertise
Topic 4.2	**Knowledge and Expertise**
▪ Content Knowledge and Expertise ▪ Clinical and Technical Skills	▪ Using expert knowledge and expertise for informing effective teaching, encouraging students learning, and supporting students to develop thinking skills and professional competent

Chapter 9 The Optional Curriculum Content

This chapter outlines the optional content of the educator-curriculum containing all non-consensus items of the educator panel. Based on a similar framework used to categorise the core curriculum content, the optional content can be classified into three domains. Domain 5 contains items relating to the teaching role. Domains 6 and 7 focus on other roles of dental educators (research, administration, and healthcare).

9.1 Domain 5 Educational Principles in a Specific Context

This domain describes educational principles for specific contexts (Table 9.1). In the educator panel, all items in this domain failed to achieve consensus. It is possible that educators perceived these items as irrelevant to their contexts. For example, some small dental schools may not employ interprofessional or outreach teaching due to the lack of resources and collaborations. However, in the student panel, they generally agreed that items in this domain (apart from Large Group Teaching) are more important than the educator panel. Similarly to Domain 3, students might expect educators to be competent and be able to support students in every educational context.

Despite the mean score, the first three items – 'Inter-/Multi-Professional Teaching', 'Career Guidance Skills', and 'Outreach/Community Based/Workplace-Based Teaching' – had a high level of consensus (>80%). It is possible to consider these items as important and could be included in the educator-curriculum. In the discussion, the term 'interprofessional education' and 'outreach education' are used to demonstrate both teaching

and learning aspects of the topic 'Inter-/Multi-Professional Teaching' and 'Outreach/Community Based/Workplace-Based Teaching' respectively.

Table 9.1 Educational content and results of Domain 5: Educational Principles in a Specific Context.

Educational Content	Educator			Student			Significant Difference (Mann-Whitney U test) $\alpha = 0.05$
	%	Mean	Result	%	Mean	Result	
1. Inter-/Multi-professional Teaching	89	3.1	NC	87	3.3	CI	-
2. Career Guidance Skills	87	3.1	NC	94	3.6	CI	p=0.018
3. Outreach/Community Based/Workplace-Based Teaching	81	3.0	NC	87	3.3	CI	p=0.039
4. Learners with Special Needs	64	2.7	NC	77	3.0	NC	-
5. Large Group Teaching	64	2.7	NC	21	1.9	CE	p=0.000

% = Percentage of participants who rated 3 or 4 (i.e. level of consensus)

CI = Consensus (Including)

CE = Consensus (Excluding)

NC = Non-Consensus

This domain consists of five issues: interprofessional education, career guidance skills, outreach education, learners with special needs, and large group teaching.

9.1.1 Interprofessional Education

Educators asserted that interprofessional education is important for students as several dental problems relate to other health problems, so it allows dentistry to link and work with other healthcare professionals.

> *"Interprofessional teaching is also essential at this stage. We know now that many oral/dental problems are related to the other health problems."* (T2/E01-2/N-Europe)

Interprofessional education allows different healthcare professionals to learn and work together to provide the best holistic patient care. Its benefits have been raised in the literature (see Chapter 4). However, practical problems for implementing interprofessional education have been also reported (Parsell et al. 1998; Alfano 2012). These include time constraint, high demands of resources and staffing, complex administration, assessment issues, and inflexible curriculum.

Additionally, Edmunds and Brown (2010) assert that in a small group, the learning process occurs when students start discussions with peers and participate in a group activity; learning requires interactions between students, not just putting students into a group, but working individually. This also can be applied to interprofessional education. Gathering students from different disciplines to study in a same session may not ensure that students can learn from other disciplines. The interprofessional learning will occur when students share knowledge and work together. An educator also raised a similar notion that:

> *"Inter/multi-professional education is desirable in theory but it is very difficult in practice to deliver units of a course that are interdisciplinary. If students do not engage well in interdisciplinary education it will fail."* (T2/E18/N-Europe)

Although interprofessional education is beneficial to student learning, how to effectively implement this educational strategy is still questionable. Dentistry

has a unique identity, cultural practices, and beliefs (Fugill 2012); this could create cultural barriers toward learning across disciplines as other professions may not understand the nature of dental professionals. This potentially leads to a communication failure (i.e. one discipline does not understand jargon used by other disciplines) and negative attitudes amongst disciplines. Consequently, it is possible that interprofessional education is not employed in some contexts so as to avoid the conflicts amongst professionals due to the different professional natures and cultures.

Additionally, because interprofessional education requires collaboration and support from many stakeholders, and resources from an institution (Freeth 2010), educators may perceive these factors as barriers and refuse to implement them into an UG-curriculum. It is essential to create a positive attitude toward interprofessional education as well as developing institutional support and resources for this educational method. This suggests that the educator-curriculum needs to highlight the importance and benefits of interprofessional education and how to implement it efficiently in order to enhance student learning and improve patient care. However, it must be acknowledged that where resources and practicality are constraints, this topic can be considered as optional for the educator-curriculum.

9.1.2 Outreach Education

The previous topic revealed that interprofessional education is important for holistic patient care and for moving dentistry back to be a part of the healthcare team. This topic represents outreach education as another strategy to support the similar notion.

Outreach education is one strategy which is developed and implemented gradually. Since dentistry has been separated from medicine as an independent profession and UG curricula across Europe have been

harmonised toward odontology, dentistry seems to move out of the part of general and holistic healthcare team. One educator raised a concern that:

> *"Outreach/community … teaching approach is needed, because dentistry has for too long time been separated from the community and other health professionals."* (T2/E01/N-Europe)

Outreach education is a strategy which helps maintain a link between dentistry and other professionals in order to support the whole healthcare system (Elkind 2002; Formicola and Bailit 2012). It allows students to develop essential skills for working in a healthcare team (see Chapter 4). It could be an effective way to help students moving from ideal practice (in a university) to a realistic professional arena. Students may be able to practice in an outreach clinic where there is a demand for simple dental treatment. This kind of treatment is sometimes difficult to access especially when students practice in a teaching hospital where patients are referred for secondary or tertiary consultant care.

However, a potential problem about outreach education is its quality (both educational and healthcare). This issue was also mentioned by an educator:

> *"Sometimes outreach teaching is helpful and gives experience, sometimes the students learn too well how to cut corners. Quality control of outreach clinical experience is sometimes difficult to monitor, in my experience at least."* (T2/E05/N-Europe)

It is commented in the literature that infrastructures, quality and standards, staff development, collaboration between a university and an outreach site,

and educational monitoring are crucial factors that influence the effectiveness of outreach education (Elkind 2002; Waterhouse et al. 2008; Eriksen et al. 2011). If the educational quality receives less consideration, then the focus of outreach practice might shift from education-based to service-based. Students might learn not to follow the clinical standards in order to gain more clinical cases (and experience). This probably leads to a conflict between 'the best' and 'good enough' (i.e. students do not know whether to provide an ideal but time-consuming treatment or just adequate treatment with favourable time effectiveness). Additionally, most local staff are practitioners, they may not be familiar with or lack educational knowledge and experience and hence the student will lose an opportunity to discuss and learn from an everyday ethical dilemma. Students may receive lack of feedback on learning and development from local staff.

The above discussion suggests that educators still need to be aware of educational quality of outreach education and gain more understanding of educational knowledge which informs effective outreach education. University educators need to know how to develop good quality outreach education programs while outreach educators need to develop educational competence. The similar notion was raised in this study by an educator who observed that *"It requires well trained teachers similar to those part-time staff who supervise in dental hospital clinics"* (T2/E18/N-Europe).

However, it can be argued that outreach education may not be necessary in every context as some European countries do not utilise this type of education.

> *"We do not have any community clinics in this country, so the advantages of outreach clinical training are not all that clear."* (T2/E02-2/W-Europe)

As discussed earlier, effective outreach education requires a large amount of resources, support, and good management; it may not be practical to implement outreach education if these factors are the constraint. In this case, a local institution needs to balance the viewpoints and decide if the outreach education need to be included as a part of the educator-curriculum. This topic can be either compulsory or optional depending on the context.

9.1.3 Career Guidance Skills

This study reveals that the item 'Career Guidance Skills' achieved high level of consensus (>85%) in both educator and student panels. More students perceived this item as essential than educators (p=0.018). Students might expect their educators to be able to give advice about career choices and explain how teaching and learning inform their future career. The result is consistent with the notion raised by Chambers (1993) that although students achieve the competent level at the end of UG-curriculum, learning and development still occur toward the higher level of novice-expert continuum throughout their professional life. As an UG-curriculum is a beginning point of the dental profession, students need to know about their future career options and how to develop themselves to achieve the best for their careers. It would be beneficial if students understand how the UG-curriculum informs their future practice and helps them preparing for an appropriate career choice.

Previous literature shows that information about career options helps students gaining insight about practice and career development (Scott 2003; Rupp et al. 2006; Gallagher et al. 2007). Career guidance from educators can motivate and support students to achieve their professional goal and select a proper career pathway. A student also supported this point by commenting that *"Support for the future beyond dental school is very important"* (T12/P5/N-Europe).

One might argue that it is not necessary to include the item 'Career Guidance Skills' in the educator-curriculum because educators already have invaluable experience regarding careers in dentistry. They are able to provide career advice to students without any training. However, the study result contradicts this point as participants in both panels agreed this topic is important. This possibly reflects that educators' personal experience is not sufficient for student to gain insight about professional career or their experience might be relevant to students' expectation. In UK, for instance, there are several career pathways which a graduate can choose (e.g. specialist training, Masters degree, academic career, etc.). If a student needs general information about career choices, it is nearly impossible for educators who have never worked in a community practice (e.g. most full-time academics) to provide advice which relates to professional practice in the community. Although educators are not expected to understand everything about a professional career, the example above suggests that at least educators need basic knowledge about career and professional development pathways in their own context (country) so that they can provide general advice to students.

Educators need to be aware that career choices and development depend on local context. Some European countries have a narrow (or even single) career choice that in which graduates can only work for the government before they can develop their own specialities later; while graduates in some countries can work in different sectors (e.g. public, private) or can immediately embark upon a specialist training pathway (Kravitz et al. 2014). Career choices can also be shaped by a specific need from the profession. In Ireland, for instance, a Doctor of Clinical Dentistry programme emphasises dental practice rather than academic knowledge and research methodology compared to the traditional PhD (NQAI 2006). This programme focuses the need for specific professional practice and local organisational issues.

In summary, career guidance skills need to focus on understanding of local contexts and how they influence career pathways in a specific country. Educators require these skills to provide guidance, which motivates students to achieve their career goals. Educators may not need to solve students' problems but have to be able to recognise students' concerns in order to refer students to appropriate support from the university or specialists.

9.1.4 Learners with Special Needs

Regarding the literature review in Chapter 4, there are several factors causing learning difficulties to students; these factors lead to 'special needs' for learning. Learners with special needs can possibly be classified into two categories. The first group is normal learners whose learning is compromised due to personal and academic issues (e.g. mismatch between learning styles and educational methods, stress from family or financial problems). Issues regarding this group of learners were discussed in Domain 2 Topic 8.2.3 'Learning Support in Dentistry'.

Another group which is a primary focus of this topic is learners whose learning is compromised due to medical conditions (e.g. dyslexia, cerebral palsy, wheelchair users). These learners require special support to overcome their medical problems for enhancing learning. The study result showed that the item 'Learners with Special Needs' did not achieve consensus in both panels. One possible reason is that participants were confused by the term and misunderstood that learners with special needs include the first group (normal learners) who are struggling with learning. For example, an educator commented that:

> *"… individuals with certain special learning needs may not be best suited to a career in dentistry and as such may not be represented in the typical dental student body."* (T3/E34/N-Europe)

From this comment, it seems that special learning needs can be interpreted in different ways (e.g. what 'certain special learning needs' are in this context). This problem probably was caused by an unclear explanation of the item learners with special needs provided as supplementary information to the Delphi questionnaire (see Appendix D).

The comment above could also imply that as dentistry requires physical (manual) skills, it is unlikely that students with certain physical disabilities will enter into an UG-curriculum. However, some learning difficulties such as dyslexia can be developed during the study. A dental school seems to get a small number of students who have been diagnosed with dyslexia because they are not obligated to reveal this problem on their application form. Although the student support service in a university can provide advice and support to these students, it is still essential for educators to understand the nature of these students and be able to support them within the dental school. It would be beneficial if educators have fundamental knowledge about learners with special needs. Similarly to the topic career guidance skills, educators do not necessarily need to solve students' problems but they need to be able to recognise them and refer students to receive appropriate support. However, not all educators may need to deal with these students; therefore, this topic can be considered as optional.

9.1.5 Large Group Teaching

The study results showed that 'Large Group Teaching' did not achieve consensus in the educator panel, but achieved consensus (excluding) in the student panel. This is the most controversial issue in this study. Only 64% of educators in this study perceived that learning about large group teaching was essential or desirable. It was also commented that *"Large group teaching encourages passive learning and so should not be the main mode of delivery of information"* (T2/E18-2/N-Europe). One possible explanation is that education at all levels across the world has been moving toward student-

centred learning and lifelong learning (UIL 2008; EHEA 2009; P21 2014); the focus of this policy supports the utilisation of educational strategies that encourage active engagement and learning. Educators might perceive that large group teaching cannot support the active learning strategies.

However, while the item achieved 64% consensus for inclusion, it could be argued that large group teaching is still desirable. Previous studies found that educators still need to be competent in large group teaching (Hesketh et al. 2001; Hand 2006). Its benefits include: it can be inspirational (Oliver et al. 2008); it is effective for delivering abstract knowledge (Karagiorgi and Symeou 2005); and it can be used to introduce a topic (e.g. as a video lecture) prior to small group learning (Bishop and Verleger 2013).

One educator commented that *"the methods for making this teaching mode more attractive and efficient could be the subject of the educators' course"* (T2/E22-2/S-Europe). The literature shows that lectures embedded with interactive components can stimulate student learning (Brown and Manogue 2001; Graffam 2007; Long and Lock 2010). It is essential that educators need to know how to adapt active learning components within large group teaching in order to promote deep learning.

Another advantage of large group teaching is that it is effective for providing an overview of knowledge to a large number of students while using a small amount of resources (Long and Lock 2010). Educators also supported this notion: For example, one commented *"I recognize that when the number of students is very high, it's the only mode you can use"* (T2/E13/W-Europe). This indicates that sometimes this teaching method is inevitable, so it would be beneficial if educators are able to provide effective large group teaching. In some contexts where budgets or resources are limited, large group teaching can be the only method to overcome the problem. One educator

raised a similar issue that large group teaching is essential for a school that has financial constraints.

> *"For me teaching in large groups is still necessary because, … dental schools do not have enough financial means to pay enough educators so that large groups may [not] be avoided."* (T2/E27-2/W-Europe)

The above discussion suggests that large group teaching is still essential in some contexts. If this topic is included in the educator-curriculum, it needs to focus on how employ active learning components into large group teaching and enable students to develop deep learning.

9.1.5.1 Effective Communication

For the student panel, only 21% of students agreed that large group teaching is essential for the educator-curriculum. One explanation is that since the European educational system has been moving toward a student-centred approach, students are familiar with active learning methods (e.g. small-group learning) and perceive that passive learning strategies are not as effective. Additionally, it was mentioned by a student that *"I have experienced quite many times that the educators fail to lecture well because they have not had the training in lecturing big groups"* (T2/P1/N-Europe). This infers that although educators are familiar with large group teaching because it was the method they were taught in the past, it does not mean they are able to effectively and efficiently teach in a large group.

Another student raised that *"There is a need for effective communication in large lecture environment"* (T2/P2/N-Europe). This highlights that one factor which informs good large group teaching is effective communication. It supports Domain 4 Topic 8.4.1.2 that the educator-curriculum needs to help

educators developing communication skills. It is essential not only for being a good role model or supporting teaching in clinical environment, but also for providing effective large group teaching. This suggests that educators still need to develop competence in large group teaching and associated skills.

9.1.5.2 Impact of Cultures on Large Group Teaching

There is no definite conclusion whether large group teaching is beneficial or not because it has both advantages and disadvantages depending on the context (see Chapter 4). Thus, it is important to consider the factors which influence the use and effectiveness of this teaching method. One influence which needs consideration is the socio-cultural factor because respondents in this study were from different European countries where there are diverse cultures.

Regarding the hierarchy dimension of Hofstede's cultural model (see Chapter 5), it was found that students in some LPD countries have better problem-solving skills while the educational system still relies on teacher-centred and passive learning (Hofstede et al. 2010). Because passive learning is perceived differently between SPD and LPD cultures, it is possible that LPD students see large group teaching as a method that enables them to reflect on what they have learned and using higher-ordered thinking skills (e.g. critical thinking) to develop deep learning. SPD students may see this method as ineffective as they prefer learning through active engagement. This example indicates that assertions of many previous studies which perceive large group teaching as not being as effective as active learning methods may be mistaken. Characteristics of LPD culture should be perceived as an educational strength which reflects that passive learning strategies are still important and effective in some specific circumstances. The whole educational system needs to be reconsidered and a change of perception towards large group teaching should become more positive. Regarding the study result, the majority of respondents were from Northern

and Western Europe where their culture is SPD. This reflects why the item large group teaching achieved a very low percentage.

In theory, Northern European countries are SPD and LUA where students can learn effectively using active small group strategies better than passive large group methods. However, the study results showed that students from Northern Europe rated the item large group teaching higher than students from Southern Europe (p-value = 0.020, Appendix I). There are three possible explanations for this finding. First, although previous studies claim that students in Northern European countries prefer active engagement and learning through challenging and problem solving, it may not be able to surmise that all students can benefit from active learning strategies because students have different learning styles even they are from a similar cultural background (see Chapter 5). In this case, large group teaching could allow students to develop basic knowledge and help them to learn new information.

Secondly, in Domain 1, it was found that educators have not had sufficient understanding of educational theories to provide effective teaching and learning. This suggests that active learning strategies may not be utilised appropriately (e.g. insufficient support/guidance from educators). When students cannot fully develop learning through active approaches, they would prefer educators to give them more information and knowledge to fulfil their learning needs. This can lead to the need for more passive large group sessions and students expecting educators to provide this strategy to meet their needs.

Thirdly, contrary to the second explanation, active learning strategies may be already implemented effectively and generally perceived as an essential part in an UG-curriculum. Educators may perceive that large group teaching is not as beneficial as other active learning methods; so they may (1) lack a

positive attitude toward large group teaching or (2) not be eager to teach in a large group setting or (3) receive insufficient training on how to develop and deliver effective large group teaching. Students might perceive this as a problem and need their educators to develop better large group teaching. However, due to the limitation of the Delphi method, it cannot provide rich qualitative data, and so further research into influences of culture on large group and small group teaching is still required.

In light of the above, although large group teaching may not be the best educational strategy in dental education, it still provides several benefits in both learning and practical perspectives. In a context where large group teaching is still employed, the educator-curriculum needs to emphasise the awareness of cultural differences that can compromise or enhance the quality of large group teaching, and how to deliver effective large group teaching that encourages students to actively engage with learning. In contrast, in some countries where large group teaching is not generally used (Rohlin et al. 1998), this topic may not need to be included in the educator-curriculum.

9.1.6 Summary of Domain 5

Domain 5 focuses on educational principles and issues related to a specific context. Topics and key issues of this domain that have been discussed above are presented in the Table 9.2.

Table 9.2 Topics, content, and key issues in Domain 5.

Domain 5: Education Principles in a Specific Context	
Educational Content	**Recommended Key issues**
Topic 5.1	**Interprofessional Education**
Key Issues	▪ Importance and benefits of interprofessional education ▪ Developing and implementing interprofessional education ▪ How to gain awareness of and positive perception toward interprofessional education
Topic 5.2	**Outreach Education**
Key Issues	▪ Importance and benefits of outreach education on students, dental professionals, and the society ▪ How to support students develop professional competences through outreach education ▪ How to improve and maintain educational quality of outreach education
Topic 5.3	**Career Guidance Skills**
Key Issues	▪ Basic knowledge about career and professional development pathways in a local context ▪ How to motivate and support students to achieve professional and career goal
Topic 5.4	**Learners with Special Needs**
Key Issues	▪ Knowledge about the nature of 'learners with special needs' ▪ How to recognise students' concerns/needs and how to refer students to receive appropriate support from the university or specialists
Topic 5.5	**Large Group Teaching**
Key Issues	▪ How to develop and deliver effective large group teaching that encourages active engagement and learning ▪ Cultural factors that influence the quality of large group teaching

9.2 Domain 6 Educational Research

This domain covers the topic of educational research and its application to dental education. Results of the educator and student panels in Domain 6 are presented in Table 9.3.

Table 9.3 Educational content and results of Domain 6: Educational Research.

Educational Content	Educator			Student		
	%	Mean	Result	%	Mean	Result
1. Educational Research and Methods	82	3.1	NC	84	3.2	CI
2. Research Components and Processes	72	3.0	NC	82	3.1	NC

% = Percentage of participants who rated 3 or 4 (i.e. level of consensus)

CI = Consensus (Including)

NC = Non-Consensus

This domain considers content related to educational research. Neither item in this domain achieved consensus from the educator panel and only one item achieved consensus from the student panel. Additionally, there was no statistically significant difference on the items in this domain between the educator and student panels. However, it was found that the level of consensus in both panels was relatively high. It is possible to interpret this as

education research is important for educators but there are several controversial issues which need consideration.

9.2.1 The Need for Educational Research

Respondents in this study suggested that educational research helps educators to know what is going on in dental education and understand what educational strategies work and are effective. It is also important for supporting the staff's teaching roles and the educational goal of a university (i.e. improving standards of education for the benefit of students).

> *"We need more research on dental education to know what really works!"* (T8/E13/W-Europe)

> *"Learning and teaching must be backed up by research in a university environment; otherwise universities will fail in their mission."* (T8/E33/N-Europe)

The first comment is consistent with previous literature that understanding of educational research is essential for educators as it allows them to select and apply appropriate educational strategies to develop students based on sound evidence (Hesketh et al. 2001; Bullock and Firmstone 2008; Molenaar et al. 2009). The second comment suggests that educational research is essential for a university and ultimately for students. If the goal of a university is to provide high quality teaching and learning, educational research could provide evidence and good practice to support this goal. A large number of research studies have also revealed successful implementation of evidence-based educational strategies for enhancing student learning as well as improving quality of a curriculum (see Chapter 4). However, this study highlighted that there is a lack of research in dental education.

"I agree that dentistry does not have enough educational research."
(T8/E47-2/N-Europe)

Doing research and producing academic publications are the primary requirements for academic career development (Smesny et al. 2007), although the teaching role has been gained more recognition in the HE context (Dearing 1997; HEA 2013). The majority of dental educators probably conduct research which relates to their clinical work rather than educational research. Albeit there have been calls for more pedagogical research and positive movement in dental educational research which has resulted in gaining a number of published papers in dental education journals (Sukotjo et al. 2010), their growth is dwarfed by that of journal papers on other dental subjects. Moreover, the impact factors of dental education journals are relatively low compared with other 'specialty' dental journals. Thus, educators still perceive that educational research is not important nor beneficial for their academic duties and career development; they leave this to a small group of educators who devote their energies to dental education. This situation pushes 'education-related research' in dentistry to be undervalued and not of interest to most educators.

In light of the above, if educational research is beneficial, especially for improving teaching and learning, and research and researchers in dental education are still needed, then educational research should be included in the educator-curriculum.

9.2.2 Benefits of Educational Research

It was raised by an educator that *"… we need more qualified researchers in dental education"* (T8/E13/W-Europe). However, this notion was argued that *"not everyone in dental education needs to be a researcher in the field [of education]"* (T8/E11-2/N-Europe).

This controversial issue probably relates to roles and responsibilities of educators. Demographic information of the educator panel reveals that (1) a quarter of educators were part-time staff and (2) of nearly two-thirds of educators involved in UG teaching less than 40% of their duties (Chapter 7 Table 7.4). This indicates that these educators are primarily involved in other roles in addition to UG teaching. Educators, who are involved in dental education, may have different roles, responsibilities, and academic positions (Bullock and Firmstone 2008; COPDEND 2013a). Consequently, any kind of research (including educational research) may not provide direct benefit to their career development and promotion because research is essential only for academic careers (Smesny et al. 2007). Even for university academics, educational research is not a requirement for educators in terms of career advancement (Bertolami 2002).

A similar issue has happened in the UK context. Using Cardiff University as an example, a university academic post can be either 'Teaching/Research' or 'Teaching/Scholarship'. 'Teaching/Research' focuses on conducting research in a specific discipline as well as teaching roles, although teaching duties may be fewer than research-related activities. The primary requirements for career development rely on research publication and contribution. In contrast, 'Teaching/Scholarship' concentrates mainly on teaching-related duties while research-related roles are less emphasised. However, while the nature of this post is teaching-focused, research publication and contribution is still an indicator for career development. One might perceive that having career advancement through 'Teaching/Scholarship' seems to be more difficult than 'Teaching/Research' as a result of high teaching workload and also research requirements, although there is a scarcity of research studies has focused on this issue.

The 'research' academics are expected to produce high quality (and quantity) of research publications. While concentrating more on research, teaching

responsibilities may be perceived as a lesser priority. Education-related research (which is not a part of career development), consequently, is not of interest to these academics. Further, for 'teaching' academics, although their main duties relate to teaching, this may not guarantee that educational research receives better recognition by these academics. While 'research' academics need to focus on research activities, it is inevitable that 'teaching' academics need to take responsibility for most of the teaching workload within a school. Teaching covers not only direct contact hours with students (e.g. classroom teaching, clinical practice) but also other administrative tasks (e.g. lesson planning, course and curriculum documentation and management) (Harden and Laidlaw 2012). Additionally, research publication is an essential task for 'teaching' academics. It is not unusual that 'teaching' academics are burdened by both routine teaching duties and disciplined-related research activities. Altogether, it is difficult for 'teaching' academics to focus on educational research.

Further, a study by Hand (2006) also articulates that educational research is not essential for teaching-led educators. This notion re-emphasises that educational research is not high priority or essential duty for educators. The above situation leads to the problem that there are not many educators contributing or devoting their careers to research in dental education as it may be considered a burden or an additional workload. The above discussion suggests that although educational research is important for improving teaching and learning, most educators may not benefit from educational research.

However, this study found that roles, responsibilities, and academic positions of educators provide no statistically significant influence on educators' opinions on educational research (Chapter 7 Table 7.10). Further the level of consensus in both items in Domain 6 were high (Table 9.3). Educators might perceive that educational research is beneficial to other aspects of their

career. As discussed in Chapter 2, the scope of UG-DentalEduc covers not only educational process (e.g. teaching and learning) but also the institutional factors (e.g. managerial structure, policy) and influences of external factors (e.g. politics). Hence, the focus of dental education research can be at different issues and levels. This enables educators to select and apply relevant evidence to support other roles (e.g. administration roles). For instance, Yarbrough et al. (2011) provide a guideline for evaluating an educational programme. Educators who get involved in evaluating a course or curriculum could apply the guideline to support and improve quality of their works. The above discussion implies that educational research is important for educators in different aspects of their roles. Educational research still need to be a part of educator-curriculum; however, it is necessary to focus on issues that are most beneficial to most educators.

9.2.3 The Focus of Educational Research in Dentistry

While the previous section suggests that educational research could be beneficial beyond teaching roles, not all educators need to be researchers/experts in dental education. They need to possess fundamental knowledge of educational research in order to support their teaching role and be able to critically appraise the education literature (COPDEND 2013a). Respondent provided similar comments that educators need to be aware of and learn about educational research and be able to evaluate educational research and understand research processes.

"My opinion is that you need to be aware of educational research, methods, components and processes if you want to be a good educator." (T8/E13-2/W-Europe)

"It is more important to be able to evaluate educational research and other research and to know about ethical considerations, funding and the mentioned processes, which are also applicable to other types of research, which are important to understand when teaching in dentistry." (T8/E26-2/W-Europe)

The finding is congruent with a suggestion by Oliver et al. (2008) that educators need to provide evidence-based teaching and be able to develop an educational strategy to support student learning. Understanding of principles of educational research could help educators to select appropriate evidence to support their teaching practice. Standards for educators published by several professional bodies also recommend that educators need to be able to critically evaluate evidence and good practice in education to inform their teaching and enhance their work (NLN 2005; AoME 2011; HEA 2011; COPDEND 2013a). An understanding of how to evaluate educational research is a key learning point. When research is evaluated, it allows educators to select appropriate evidence to support their teaching or develop a new teaching method to efficiently support student learning. Hence, the emphasis of educational research should be evaluation of educational research. This notion is congruent with and also supports 'Evidence-Based Education' in Domain 1. Thus, understand of educational research is essential for improving teaching and learning.

9.2.4 Educational Research in an Advanced Training

One respondent suggested that educational research needs to be taught as a further course rather than included in a basic educator-curriculum.

"A basic curriculum for teachers of dentistry does not necessarily have to include the research aspects of teaching and learning, they could be a topic for further education." (T8/E16-2/N-Europe)

As a training programme has a limited timeframe and resources, it is impossible to include all topics of dental education in the curriculum/programme. Educational research is considered as important for all educators; however, not all educators need to learn in-depth information about this topic. Hence, if there are needs for teaching development or research in dental education, educational research needs to be considered as a high priority for inclusion in the educator-curriculum. Otherwise, it could be taught in an optional or advanced course. However, according to the European Qualification Framework, applying knowledge and understanding into a research context is a requirement for gaining a second cycle qualification (i.e. a Masters degree) (Bologna Working Group 2005). In this case, if the educator-curriculum is developed for a Masters degree, educational research must be, inevitably, a compulsory module of the curriculum. The issue of how to undertake research in education (e.g. how to set up and conduct a research project, how to analyse the results, how to write up and publish research findings) must be the requirement for dental educators to be taught in this module.

9.2.5 Summary of Domain 6

Domain 6 focuses on educational research and its application to dental education. Topics, content, and key issues of this domain are presented in Table 9.4.

Table 9.4 Topics, content, and key issues in Domain 6.

Domain 6: Educational Research

Educational Content	Recommended Key issues
Topic 6.1 **Educational Research and Methods**	▪ Principles of educational research ▪ How to evaluate educational research in order to inform effective teaching and learning in dental education
Topic 6.2 **Research Components and Processes**	▪ Components of educational research ▪ Processes of conducting educational research and how to apply the processes to other types of research

9.3 Domain 7 Educational and Healthcare Management

This domain outlines the educational basis of educational and healthcare management (Table 9.5). Although there are some overlaps of general concepts between this domain and Domain 3 such as QA, this domain only focuses on the 'non-consensus' items which are not the part of the core curriculum content of the educator-curriculum.

Table 9.5 Educational content and results of Domain 7: Educational and Healthcare Management.

Educational Content	Educator			Student			Significant Difference (Mann-Whitney U test) $\alpha = 0.05$
	%	Mean	Result	%	Mean	Result	
Topic 7.1 Educational Change and Management							
1. Educational Change	76	3.0	NC	81	3.1	NC	-
2. Educational System and Dental Education	74	3.0	NC	82	3.3	CI	-
3. Management and Organisation Principles in Dental Education	64	2.8	NC	85	3.3	CI	p=0.006
Topic 7.2 Student Admission							
4. Student Recruitment and Admission	67	2.9	NC	88	3.4	CI	p=0.024
Topic 7.3 Regulatory Bodies and Healthcare System							
5. Local/National QA and Regulatory Bodies	79	3.0	NC	82	3.2	CI	-
6. Healthcare System and Management	76	3.0	NC	95	3.6	CI	p=0.002

% = Percentage of participants who rated 3 or 4 (i.e. level of consensus)   CI = Consensus (Including)   NC = Non-Consensus

Although all items did not achieve consensus in the educator panel, in the student panel most items achieved consensus with a high level of consensus (>80%). It may be similar to Domain 3 in that educators perceived that these

items are not directly related to their teaching role. However, the point must be made that the level of consensus in this domain was lower than in Domain 3 in both panels (i.e. this domain had a greater degree of disagreement). This reflects that this domain is less important than Domain 3 or it might be influenced by other factors (e.g. local contexts) which needs consideration.

Using the structure of UG-DentalEduc represented in Chapter 2, this domain can be categorised into three topics: educational change management, student admission, and regulatory bodies and system. The first topic relates to the institutional issues that support the CBC. Student admission focuses on the 'input' of the curriculum. The last topic represents the external factors that influence the curriculum and institutional issues.

9.3.1 Educational Change and Management

This topic includes three items: educational change, educational system and dental education, and management and organisation principles in dental education, which indicate a basic understanding of change and management in dental education. Although they did not achieve consensus in the educator panel, it was commented by an educator that *"I also think that managing the process of educational change is important, because dental education is constantly evolving"* (T9/E47-2/N-Europe). A number of developments (e.g. CBE, the European credit system) resulted in a major change in UG-DentalEduc. In order to implement developments in dental education, management of educational change is required (Oliver et al. 2008).

This notion is congruent with one comment that *"Within the [curriculum] implementation … management of change needs to be a subject"* (T6/E20/W-Europe). Within the change process, resistance from stakeholders can be found; hence, an ability to manage people and circumstance during educational change in order to deal with stress,

resistance, and transition is essential (Cohen 2005; Hayes 2007). This highlights that management of change is important to overcome the resistance and achieve the educational goal. If educators have knowledge in educational change management, they can cope with the transitions and support the development in dental education. It is also recommended in the literature that the ability to manage and promote change is essential for being effective educators (Hesketh et al. 2001; Srinivasan et al. 2011).

In addition to change management, educators raised that understanding of principles of management is also beneficial.

"Meeting international requirements is also essential and current curriculum changes that are underway have called on better management." (T9/E05/N-Europe)

Good management is needed in order to support operating and adapting an institution toward change and development in dental education (Dunning et al. 2009). However, the lack of literature indicates that 'organisation and management' is an essential issue for developing educators. One possible explanation is management (especially at the organisational level) is not directly related to the teaching role, so educators may not think they need to learn and develop management skills.

The results for Domain 3, lent weight to the argument that leadership is urgently needed in dental education and educators need to develop leadership skills to support development in dental education. The discussion in this topic adds that good management is also required for making the educational system and development run effectively. Ideally, all educators need to have a basic understanding of change and management to support

the educational development. Several studies also assert that educators need to have a basic competence of every role including management roles (Prideaux et al. 2000; Harris et al. 2007; Bligh and Brice 2009). However, in practice, not all educators get involved in change and management process, especially the part-time clinical educators. Altogether, the topic of educational change and management can be considered as optional as it may not be a necessary topic for all educators.

9.3.2 Student Admission

The issues of student admission relate to the CBE principles and influence the quality and outcome of UG-curriculum (see Chapter 2). The item 'Student Recruitment and Admission' achieved a low percentage of agreement in the educator panel but achieved a high percentage in the student panel. It is possible that educators perceived the issue of recruitment and admission as a duty of a dental school and a group of responsible staff while students perceived that it is the issue which directly relates to student life. Students possibly expect the recruitment and admission system to be fair and transparent; they might perceive this as a direct responsibility of educators.

There is a lack of evidence to show that educators need to be competent in recruitment and admissions. However, it can be argued that this issue is an important part of any UG-curriculum as every school wants to select the students who are most likely to succeed in the programme. Regarding the review in Chapter 2, the pre-defined set of competence can be used to anticipate which students have the potential to successfully complete the programme and be competent dental practitioners. Recruitment and admission results could help an institution to prepare appropriate resources and support for students in order to minimise or prevent any potential problems related to learning difficulties. This suggestion was reflected in a comment made by an educator:

> *"Student recruitment is essential - as this is the basic building block -*
> *get recruitment wrong and you may have a life-long problem dentist."*
> (T9/E03/N-Europe)

This suggests that student recruitment and admission are crucial processes which may indicate success or failure of students and the UG-curriculum. If educators understand and are able to support the admission process and its development, it is likely for a dental school to get a high number of potential students into its curriculum. In contrast, if the process is not well developed or educators could not effectively support the process, the school might recruit students who lack potential to complete the course. This could cause a high dropout rate during the study or, even worse, graduates who are neither competent nor ready for their professional practice. In short, getting high quality and appropriate students into the UG-curriculum is essential; educators need to be able to support the recruitment and admission process.

However, it can be argued that not all educators need to get involved in this process. Student admission can be provided as an optional module in the educator-curriculum which allows educators who are interested in or involved in student recruitment and admissions to gain better understanding of this issue.

9.3.3 Regulatory Bodies and Healthcare Systems

This topic describes the influence of regulatory bodies and healthcare systems on dental education which includes the items local/national QA and regulatory bodies, and healthcare system and management. There is a lack of evidence indicating the necessity of knowledge of regulatory bodies and

healthcare systems for teaching roles. However, this research project reveals two issues which probably fulfil the literature gap.

It was raised by an educator that *"Some knowledge about how the regulatory system works could make it easier for teachers to adopt the QA-actions"* (T10/E02-2/W-Europe). According to Domain 3, QA and standards help educators to adapt and improve quality of their teaching. The comment raises the additional point that if educators understand the roles of different regulatory bodies, they could improve their teaching and performance more effectively.

In the UK, for example, educational quality of UG-DentalEduc is assessed by standards set by different bodies. The Quality Assurance Agency (QAA) is responsible for safeguarding the public interest and improving quality of UK higher education as a whole; the General Dental Council (GDC) monitors quality of UG curricula and is responsible for the registration and regulation of dental practitioners; the European Association for Quality Assurance in Higher Education (ENQA) provides guidelines and standards for higher education across Europe. It seems that QA is a complex process because an institution needs to prepare information which is congruent with each regulatory body. This could help educators to evaluate their teaching and performance from different aspects and provide a comprehensive scope for identifying areas of improvement. Its main benefits could be that students will receive the better teaching quality and that it levers reluctant educators to change their pedagogical methods.

Additionally, it was suggested that *"Dental Schools are preparing workers for the Healthcare Systems (either private or public) therefore teachers should prepare the future working environment of the students"* (T11/E01-2/N-Europe). Domain 1 highlights that educators need to provide positive learning environment that enhance student learning and Domain 3 suggests that educators need an understanding of healthcare standards in order to inform

teaching and assist students to maintain quality of dental practices. The comment above adds a further suggestion that understanding of the healthcare systems allow educators to clarify and help students to have an idea about how their future career environment will look. Students can have opportunities to prepare and develop essential skills in order to work in (and cope with) the real professional environment.

The above discussion suggests that the issue of regulatory bodies and healthcare systems provides benefits to both educators (to develop their teaching) and students (to develop better learning and understanding of professional career). Students might realise the importance of this issue as most of their study time is spent in clinical practice and healthcare. In contrast, educators might not acknowledge this issue as high priority as they have a variety of roles and responsibilities. This possibly explains why this topic achieved a low level of consensus in the educator panel while it achieved a high level in the student panel. The educator-curriculum needs to emphasise the educators' awareness of how an understanding of regulatory bodies and healthcare systems can provide benefits to teaching and learning. However, arguably this topic is not directly relevant to the teaching role or not the first priority of some educators (e.g. non-clinical basic sciences educators). It can be considered as an optional topic in the educator-curriculum for educators who are mainly involved in clinical teaching or who can benefit from this topic.

9.3.4 Summary of Domain 7

Domain 7 focuses on competence in educational and healthcare management. Topics and key issues of this domain that have been discussed above are presented in the Table 9.6.

Table 9.6 Topics, content, and key issues in Domain 7.

Domain 7: Educational and Healthcare Management	
Educational Content	**Recommended Key issues**
Topic 7.1	**Educational Change and Management**
▪ Educational Change ▪ Educational System and Dental Education ▪ Management and Organisation Principles in Dental Education	▪ Basic concepts of change and management that support educational development ▪ Essential management skills relating to the educational change, institution, and dental education
Topic 7.2	**Student Admission**
▪ Student Recruitment and Admission	▪ Importance of student admission toward the whole dental education and the curriculum ▪ How to develop an effective student recruitment and admission process
Topic 7.3	**Regulatory Bodies and Healthcare System**
▪ Local/National QA and Regulatory Bodies ▪ Healthcare System and Management	▪ How to gain awareness of and positive perception toward regulatory bodies and healthcare system ▪ How understanding of regulatory bodies and healthcare system provides benefits on teaching and learning ▪ Helping students to understand their future career environments (healthcare system and its environments)

Chapter 10 Factors to Consider when Developing the Educator-Curriculum

Comments and opinions from the main study and data verification were combined and thematically analysed. Analysed data which directly relate to the core and optional curriculum content were presented and discussed in the previous chapters. Data relating to developing and implementing the educator-curriculum are presented in this chapter; it comprises three themes, seven sub-themes, and five issues (Table 10.1).

Table 10.1 Demonstration of themes, sub-themes, and issues emerged from the qualitative analysis.

Theme 1 General views toward the educator-curriculum content	
Sub-theme 1-1	Scope of the educator-curriculum content
Sub-theme 1-2	Type of the educator-curriculum content
	Issue 1 Fundamental content
	Issue 2 Optional content
Theme 2 Personal factors which influence the educator-curriculum content	
Sub-theme 2-1	Academic position
Sub-theme 2-2	Teaching experience
Sub-theme 2-3	Roles and responsibilities
	Issue 1 Educators who are dental healthcare practitioners
	Issue 2 Educators who have a specific role
	Issue 3 Educators of a small dental school
Theme 3 External factors which influence the educator-curriculum content	
Sub-theme 3-1	The nature of undergraduate dental education
Sub-theme 3-2	Local needs and cultural diversity

10.1 General Views toward the Educator-Curriculum

10.1.1 Do Educators Need to Learn All Topics?

It was suggested that all educators need basic knowledge of all educational topics regardless of their roles and responsibilities.

"The extent of the knowledge required is progressive – junior lectures need less than senior lectures who need less than professors; but all need an understanding of the basics." (T1/E03/N-Europe)

Educators need a fundamental understanding of a variety of education concepts and relevant knowledge in order to effectively perform their teaching roles (Molenaar et al. 2009; COPDEND 2013a). Although some topics may not be directly relevant to a teaching role, they could inform teaching or allow students to develop their knowledge and practice to a wider context. Full-time junior educators, for example, may get involved in several academic roles in addition to the teaching role (e.g. a curriculum development team). In order to perform a variety of academic roles, they need to have understanding of and gain competences relating to these roles.

On the other hand, it was argued that individual educators do not have to know all educational topics.

"In teaching the teacher to help to develop a whole curriculum, I think these should all be included. If it is only about teaching the teacher to help to develop his or her own piece of teaching within the dental curriculum, this is my opinion – [not all items are essential]."
(T1/E26/W-Europe)

A similar notion was raised that individual educators do not need to develop educational competences in all aspects (Hand 2006; Srinivasan et al. 2011). This is probably because educators have various roles, responsibilities, and limited time available. For instance, although the previous argument claims that junior educators need to understand all educational bases in order to perform different roles, it can be argued that they will gradually acquire and develop competences when they perform a specific role or gain more experience. Moreover, those who choose 'education' as their career path may subsequently specialise in one or two areas of education. Such individuals are important as they will develop their area of expertise, be able to lead modules in their speciality and thus bring on future educators who will develop the area further.

However, junior educators may have difficulties in or struggle with teaching, especially during the early stages of their careers when they are inexperienced. Without sound educational knowledge, they can only repeat teaching in the same way that they were taught by their teachers. This way of teaching can be out-of-date and not be effective for students' learning. Consequently, this situation suggests that junior educators need to gain competence relating to teaching when they begin an academic career.

On balance, the scope of topics within the educator-curriculum depends on local context and needs. If the aim of the curriculum is to develop a degree programme for educators or to develop educators to work at the institutional level, all topics need to be included. If the aim is to develop educators to perform in a specific role or to provide induction to new academic staff, it can include only the topics which are relevant to the training purpose. However, this research project aimed to provide curriculum content for training dental educators across Europe. It is expected that educators who complete the educator-curriculum will be able to perform in an effective teaching role in any European context. It suggests that the educator-curriculum needs to

highlight topics which relate to the teaching role as well as other roles (research, administration, and healthcare).

10.1.2 Fundamental or Optional Topics?

Educators commented that several educational topics (e.g. educational principles, patient care and healthcare systems and career skills) are fundamental and, possibly, fields that all educators need to have knowledge in.

"The background philosophical aspects are important, but the approaches and methods to learning are fundamental." (T1/E36/S-Europe)

"To me, this [i.e. patient care and healthcare system, career skills] is not just essential but fundamental." (T11-12/E33-2/N-Europe)

The first comment is congruent with the results in Domain 1 that Educational principles allow educators to understand the reasons underpinning effective teaching and how to support student learning on a sound educational basis. For the second comment, as already discussed in Domains 5 and 7, educators can use knowledge of healthcare systems and career guidance skills to broaden students' learning and help them to gain understanding of professional practices. However, they may not be considered as the first priority for inclusion in the educator-curriculum because they are not directly related to teaching roles. Some European countries require dental graduates to work independently after they finish their bachelor degrees without further training (Kravitz et al. 2014); it is inevitably that knowledge of healthcare systems and career guidance skills are beneficial to support students achieving the desirable competence for being independent dentists.

However, a controversial viewpoint has been raised that educators do not have to learn/be competent in every issue of the teaching role. Some issues could be provided in an optional or advanced module/course. An example comment from an educator on this is:

> *"[QA is]… not necessary for all dental educations. They could be taught on an individual/optional basis."* (T10/E22-2/S-Europe)

Interestingly, the results of the present project reveal that both arguments are acceptable and can be used to inform the educator-curriculum. The topics which mainly relate to the teaching role (which include competence in education, research, management, and healthcare – Domains 1-4) are fundamental for all educators. They are grouped into the core curriculum content as represented in Chapter 8. Topics which are optional (Domains 5-7) include: (1) topics that are nice to know but not primarily relevant to teaching role or (2) topics that provide great insight on a particular educational issue where a specific group of educators can benefit from learning them. These topics have been discussed in Chapter 9.

10.2 Personal Factors which Influences the Educator-Curriculum

10.2.1 Academic Position and Teaching Experience

It was suggested that full-time educators need to learn content of all topics while part-time educators need to learn only the specific topics which relate to their main teaching roles.

> *"I think an understanding of dental education is important for most
> dental educators, particularly those involved full time."* (T9/E47-2/N-
> Europe)

> *"[Topic of a curriculum is] important for full-time senior educators, not
> so important for part timers who deliver the curriculum at chairside."*
> (T6/E17/N-Europe)

For full-time educators, their roles and responsibilities cover several aspects
of dental education, so they need to be competent and work in different
areas. It is congruent with a study by Hand (2006) which showed that full-
time academics need to develop broad aspects of educational competence.
In contrast, most part-time staff are clinical educators, so they need to
develop competences which mainly relate to their teaching role and possibly
only for clinical teaching. Several studies (McLeod et al. 2003; Harris et al.
2007) also highlight that clinical educators only require competence in the
areas which relate to clinical teaching.

However, it can be argued that part-time clinical educators still need to learn
about educational principles and clinical teaching. The discussion in Chapter
8 Domain 1 revealed that many part-time clinical educators are practice-led;
their teaching is concentrated on practice outcomes and clinical skills more
than educational perspective. This situation could lead to the incomplete
development of professional competences because without appropriate
learning, students can only develop technical skills but cannot develop
understanding of professional knowledge.

The above discussion suggests that full-time educators inevitably need to
develop a broad of knowledge and competence in dental education so the
educator-curriculum for these educators need to covers a wide-range of
content. For the part-time staff, albeit they may get involved only in a specific

context (e.g. clinical teaching), the emphasis of the educator-curriculum can be developing only fundamental knowledge and skills relating to their roles.

10.2.2 Roles and Responsibilities

It was commented that educators who are still involved in a healthcare practice need to learn the principles of QA and healthcare systems. They are *"a must for all those practising in healthcare today"* (T10/E17/N-Europe). and also *"important to everybody who is going to work in a healthcare environment"* (T11/E02-2/W-Europe). These topics help educators enhance their teaching and support student learning in a real clinical environment (Branch et al. 1997; Prideaux et al. 2000). This notion is in contrast with the discussion in the previous section that clinical educators may need to learn only educational concepts relating to clinical teaching.

However, the educators' comments above possibly imply that educators (especially those who are involved in clinical practice/teaching) need to be aware of QA and healthcare issues which relate to their teaching role (see Chapter 8 Domain 3). The emphasis of educator-curriculum should be on how to apply these principles to support clinical teaching rather than learning for the educators' own practice.

Some of the participants suggested that some educational topics/content such as learners with special needs, curriculum, evaluation, and educational management are for educators who have particular roles which involve these issues. They are *"relevant for only a small subgroup of teachers"* (T9/E20/W-Europe). However, some of the participants argued that these topics are required for educators who work in small dental schools. While the personnel and resources in a small school are limited, educators in the school need to be able to work in different roles (e.g. teaching, administration) to support the function of the school.

> *"Selecting appropriate students is important in this small school with limited facilities."* (T9/E05/N-Europe)

> *"In a small school, it is ESSENTIAL to be able to demonstrate quality assurance. Otherwise, graduates are not rated adequately if, for example, they apply for specialist training."* (T1/E03-2/N-Europe)

This reflects that topics which are not directly relevant to a teaching role are context dependent. In a medium/large dental school where there is sufficient manpower and resources, it is possible to distribute roles and responsibilities within the school to specific groups of educators; so not all educators need to get involved in all functions of the dental school. Junior educators, for example, might mainly be responsible for teaching and research roles while senior educators are in charge of curriculum and institutional affairs. In contrast, in a small school, everyone needs to get involved in the school affairs including student admission, management, quality assurance, and curriculum development. Educators in this context need to be competent not only in educational aspect, but also in other aspects (e.g. management). The educator-curriculum is influenced by both roles/responsibilities of educators and local context. These two factors need to be taken into account when developing an educator-curriculum.

10.3 External Factors which Influences the Educator-Curriculum

10.3.1 The Educator-Curriculum for Dentistry: Why do we need it?

It was pointed out that the nature of UG-DentalEduc is different from other health professional education. Teaching in clinical dentistry involves micro-surgery level, irreversible procedures, and patients.

"Teaching dentistry esp. clinical is totally different to other disciplines (esp. medicine) as we are training students to the level of micro-surgeons and they undertake irreversible procedures on awake, aware patients who are stressed (as going to the dentists is not enjoyable)."
(T2/E03/N-Europe)

Clinical dentistry involves more than just teaching and learning. There might be other issues (e.g. procedural skills, knowledge, professional ethics) which need to be considered. For example, the UG-DentalEduc need to ensure and demonstrate that (1) students are competent to practice independently; (2) the quality of dental procedures achieve the standard which do not cause any harm to patients; and (3) patients receive high quality oral healthcare ethically and professionally from students (Chambers and Glassman 1997; Chambers 1998; Albino et al. 2008). The results in Domain 2 (where most items achieved a very high level of consensus) also could reflect that UG-DentalEduc mainly involves direct patient contact and invasive clinical procedure; so educators need to concentrate on clinical teaching to ensure that students are competent to perform safe and high quality practice to patients. This nature is different from other health professions (e.g. medicine, nursing) where students mainly observe patients and might be involved in non-invasive procedures such as physical examinations. Further, it is mutually accepted that dentistry has unique cultural norms which indicate practices, beliefs, and identity of the profession (Fugill 2012).

The above example suggests that UG-DentalEduc is unique and sometimes principles of education used in medical education or other professions may not be fully applicable to be utilised in dentistry. The results of this research project highlight the need for a specific educator-curriculum which emphasises the dental context and the nature of dentistry. Finally, if dental education is one of the educational disciplines which relates to the dentistry,

there is no reason why we should not have the educator-curriculum for our own dental professional.

10.3.2 Local Needs and Cultures

A participant raised the point that factors including needs of the country (VX8/N-Europe), the particular cultural environment in which education takes place (VE19/S-Europe), and regional variation and diversity (VX2/N-Europe) can influence development and implementation of the educator-curriculum. Although no further information has yet been explored by this study due to the limitation of the open-ended question, findings from previous literature can explain the influences of these factors.

In some European countries (e.g. Austria, Sweden), there is no mandatory vocational training for newly dental graduates before they are given full registration (Kravitz et al. 2014). An implication for dental educators, in this context, is that they need to ensure their students are ready to be competent, independent, and safe practitioners during the UG stage.

Cultural diversity also can provide significant influences on what competences educators need to develop (see Chapter 5). However, educators need to be aware that not all students will have similar traits and learning styles even if they are from the same culture. The educator-curriculum needs to focus on how educators embed different teaching methods to enhance student learning (e.g. how to use large group teaching in conjunction with PBL).

The above examples reveal that local needs and cultures are potential factors that influence the educator-curriculum. However, there are probably other external factors which need consideration when developing and

implementing the educator-curriculum, but they have not been discovered in this study. Further study on this area, hence, is still required.

Chapter 11 Conclusion

This chapter has four sections. It begins by providing a research summary briefly presents the rationale and method used in this research study, as well as how the research question and objectives were achieved. This is followed by implications and recommendations outline how this study contributes to European dental education and broader audiences. Then, limitations and areas for further research list issues which need consideration for implementing the research findings and planning future studies. Finally, reflections discuss learning issues the author has established while conducting this study.

11.1 Research Summary

The underpinning assumption of this research is that creating a curriculum for developing and enabling dental educators to support sustainable educational change and movement at either local or international levels can be beneficial for both students and European dental education. The project aimed to agree upon curriculum content for educators of dental UG students in Europe. Adopting the perspective of critical theory and using consensus methodology, two-round Delphi questionnaires were administered to collect opinions of and seek consensus from European dental educators and students. This study has fulfilled the research question and research objectives, as the following summary displays:

Research Question: What content should be included in an agreed curriculum for educators of dental undergraduate students in Europe?

Achievement: This project has revealed seven domains of curriculum content which should be included in an educator-curriculum.

Research Objective 1: To identify core content of a curriculum for developing educators of dental undergraduate students in Europe.

Achievement: The first four domains (Educational Principles; Educational Practice in Dentistry; Curriculum, Quality, and Improvement; and Educational Professionalism) indicate essential content which all educators should develop and be competent in.

Research Objective 2: To identify context-specific content of the curriculum which is informed by external factors and local contexts.

Achievement: The last three domains (Educational Principles in a Specific Context, Educational Research, and Educational and Healthcare Management) outline content which vary by local context. They should be tailored based on the needs and circumstances of a specific context.

Research Objective 3: To identify factors which influence the curriculum content and need consideration when developing the curriculum.

Achievement: When developing an educator-curriculum, factors which should be considered are: (1) the scope and type of educational content; (2) the academic position and teaching experience of educators, (3) the roles and responsibilities of educators, (4) the nature of UG dental education, and (5) local and cultural contexts.

The study results can be summarised and represented using a temple as a structural analogue (Figure 11.1).

Figure 11.1 A structural analogue representing seven domains of curriculum content for dental educators: The temple.
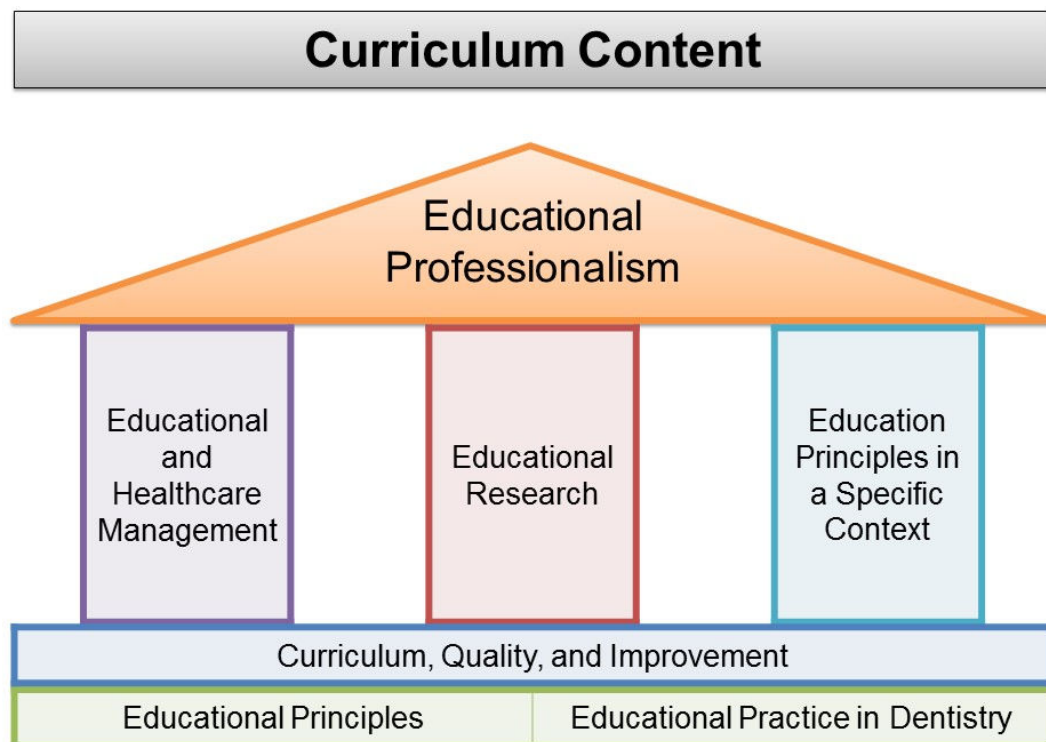
There are four core contents which are essential for teaching roles and all educators should be competent in them. **'**Educational Principles' and 'Educational Practice in Dentistry' are the base of the temple as they are the fundamentals of teaching and learning in dentistry. 'Curriculum, Quality, and Improvement', as the upper layer of the temple base, indicates other roles and responsibilities of educators which support teaching and learning. 'Educational Professionalism' is represented as the roof of the temple. It defines core values and characteristics of good, effective educators.

The optional domains which can be tailored to local needs are: 'Educational Principles in a Specific Context', 'Educational Research', and 'Educational and Healthcare Management'. They are represented as three pillars of the temple which refer to the roles of educators within the UG-DentalEduc – teaching, research, administration, and providing healthcare – which

educators need to build upon gradually during their educational career. Often, educators who get involved in administration may need to understand the healthcare system (although they do not provide healthcare) in order to manage professional-related issues or policies. Hence, 'Educational and Healthcare Management' covers both administrative and healthcare roles.

The curriculum document containing curriculum domains, educational content, and recommended issues is presented in Appendix N.

11.2 Implications and Recommendations

This section presents the novelty of the research findings and how they contribute to dental education from a wider perspective. Implications for the individual, the institutional, policy-makers, and other disciplines are discussed in turn.

11.2.1 Individual Level: Self-evaluation and personal development

The review in Chapter 3 revealed that there are four roles and 12 areas of competence relating to educators. In practice, individual educators may not get involved in all roles, so they may not need to be competent in every area. This research challenges this notion and proposes that regardless of an individual educator's roles and responsibilities, every educator needs to attain all basic competences related to the teaching role. The curriculum content identified in this study provides detailed information on those competencies deemed essential for good teaching. The content can help individual educators to evaluate their actual competence against the curriculum and identify areas for improvement which could be included in their personal development plan. Table 11.1 demonstrates how to apply the curriculum content in self-evaluation and personal development planning.

Table 11.1 An example of self-evaluation and personal development plan developed based on the curriculum content.

Name	Supachai Chuenjitwongsa				Date	14/04/2014
Educational Competence	Self-Evaluation		Action Required?		How?	Achieving Date
	Competent	Not Competent	Yes	No		
Area 1	**Educational Principles**					
Item 1	X			X		
Item 2	X			X		
Item 3		X	X		Attend a CPD course	31/03/2014
…						
Area 2	**Educational Practice in Dentistry**					
Item 1		X	X		Self-Study	In Progress
Item 2	X					
Item 3		X		X	NB: Not relevant	
…						
Area 3	**Curriculum, Quality, and Improvement**					
…						

11.2.2 Institutional Level: Faculty development (FD), continuing professional development (CPD), and a PG programme

At the institutional level, the curriculum content allows an institution to plan and tailor a FD programme to help their teaching staff improve educational competences. Additionally, the content also provides a framework for developing a CPD programme for educators, both inside and outside the institution.

Sometimes teaching is perceived by educators as not as important as research or clinical practice. Hence, FD or CPD aimed at developing the teaching role may not provide career benefits to some educators. This

situation does not encourage educators to develop educational competences. However, it is becoming increasingly inappropriate that university staff are allowed to teach students without possessing any teaching qualifications. In the UK, for example, one strategy to enable teaching career development for educators is to provide a formal PG programme in dental education. This can also support educational development within an institution, as educators with an educational qualification will be able to provide a greater contribution to teaching as well as receive better recognition on their teaching roles. Table 11.2 demonstrates an example of a part-time PG programme pathway in dental education for the UK context.

Table 11.2 An example of a Masters degree programme in dental education.

A Masters Degree Programme in Dental Education (Example)				
Level	Module Code	Module Name	Credit	Note
Postgraduate Certificate (Part-Time Year 1)	MSc01	Educational Principles	20	Compulsory Modules
	MSc02	Educational Practice in Dentistry	20	
	MSc03	Educational Professionalism	20	
Postgraduate Diploma (Part-Time Year 2)	MSc04	Curriculum, Quality, and Improvement	20	Compulsory Module
	MSc05	Education Principles in a Specific Context	20	Optional Modules (Select only 2 from 3 modules)
	MSc06	Educational Research	20	
	MSc07	Educational and Healthcare Management	20	
Master Degree	MSc08	Master Degree Dissertation	60	Must complete MSc06 module

From the example above, the certificate level covers fundamental domains which are essential for the teaching role. It is appropriate for new educators or educators who are interested in gaining basic educational competence. The diploma level supports educators developing educational competences at the higher level, as well as competences in other roles. This level is appropriate for educators who want to develop competences which are specific to their roles and responsibilities within the institution. Finally, the Masters level provides an opportunity to conduct educational research and develop essential research skills. This is designed for educators who want to contribute more fully to dental education, or to pursue a doctoral qualification in the future in order to become a specialist in dental education.

The example above also suggests that a PG programme in dental education is applicable to any educator who wants to gain development in educational competence. It provides a formal qualification which can be beneficial for some educators in terms of career development and promotion. The ultimate outcome of this strategy is to improve the quality of dental education within the institution as a whole in a long term. It is a strategy designed to create a sustainable development in dental education for the better future of the dental professional.

11.2.3 Policy-Maker Level: Informing European policies for developing educators

UG dental curricula are moving toward harmonisation across Europe in order to create a comparable qualification, thanks to the Bologna Process and the DentEd Thematic Network Project. However, the process to develop and standardise the quality of educators has not yet been established. While UG-curricula can assure the quality and support the movement of dental graduates across Europe, it cannot guarantee that educators have attained sufficient educational competences in order to provide high quality dental education. The results of this research project offer a solution for this problem

by outlining essential educational competences for dental educators in Europe. Hence, in order to create European standards for dental educators, ADEE could establish policies or regulations that enable each academic institution to implement the curriculum content for developing educators. Additional research on how to apply the model in a specific context is required to support this notion. Finally, it needs to be realised that all policies can be successful only if every stakeholder understands that the 'teaching role' and 'educators' are important for the long-term sustainable development of European dental education.

11.2.4 Other Disciplines: Developing educators within a discipline

The four roles of dental educators revealed in the review in Chapter 3 can be simplified into; teaching, research, administration, and professional. The first three roles are general roles across disciplines, whilst the last role relates in part to duties which are specific to an individual discipline. Regardless of the discipline, all educators need to be competent in teaching UG (and/or PG) students, conducting research to expand knowledge within their own discipline, supporting work at the institutional level, and applying knowledge and skills of their discipline to support people and the society. For this reason, the results of this research project as well as the 12 areas of competences that emerged from the review can also be applied into other disciplines. Table 11.3 demonstrates how this study's results could be applied to the engineering discipline which is used as an example.

Table 11.3 An example of curriculum content applied for the engineer discipline.

Curriculum Content Applied to Engineering (Example)	
Curriculum Content Area	**Examples of Content**
1 Educational Principles	➤ Fundamental principles of education basis for engineering education (e.g. reflective practice, performance-based assessment)
2 Educational Practice in Engineering	➤ Teaching and learning methods used in engineering education (e.g. laboratory, internship)
3 Curriculum, Quality, and Improvement	➤ Course/Curriculum development and evaluation ➤ Leadership, quality, and standards in engineering
4 Educational Professionalism	➤ Characteristics of a good engineering educator ➤ Role model and apprenticeship in engineering education
5 Education Principles in a Specific Context	➤ Industrial-based education (e.g. teaching and learning in an industrial site) ➤ Learners with special needs in engineering education
6 Educational Research	➤ Applied research in engineering education
7 Educational and Engineering Institution Management	➤ Organisation and management in an engineering school ➤ Regulatory bodies within the engineering discipline and their influences on teaching and learning

Disciplines applying this model need to understand the nature of their own discipline, including teaching and learning, professional duties, stakeholders, and external factors that influence the discipline. Discipline context is very important and needs to be understood so that the practicality of the content can be addressed and for the successful development of educators within the discipline.

11.3 Limitations and Suggestions for Future Research

No research project is perfect without any flaw or limitation. This section presents four key limitations arising in this research project, along with recommendations for further research.

11.3.1 Generalisation

In this study, although the respondents were educators and students across Europe, not all European countries were included in this study. The majority of respondents were from Northern and Western Europe. This could have led to biases on the study results. Additionally, although the number of participants is not the major concern for the Delphi method, as a study at the European level it would be beneficial to gain a large number of respondents so as to ensure that the results reflect information and data from every European area. I acknowledge that the limited number of respondents in this study may not fully represent the whole of the greater European views on the curriculum content. Moreover, the Delphi questionnaire was developed using English language, this could provide biases toward English-speaking countries. From the above discussion, the study results may not be fully generalised across Europe. Future research needs to develop a strategy which can gather responses from representatives from all European countries. This would enhance the generalisability of the study results.

11.3.2 Appropriate Approaches for Gathering Information

This research adopted critical theory and consensus methodology as a framework to support research propositions and research questions. The Delphi method provided results that were designed to answer the research questions. Whilst this research revealed an agreed curriculum content and influencing factors, the results have not been fully explored. The underlying reasons why specific curriculum content is essential in dentistry are not explained, or how local factors (e.g. culture, politics) influence the educator-curriculum. Although the critical theory does not rule out the use of qualitative approaches for gathering in-depth data, I acknowledge that other philosophical frameworks such as constructionism could have allowed me to explore the educator-curriculum at a broader and deeper level. Additionally, qualitative approaches may enable a study to discover more factors and issues relating to the curriculum and local context. This study provides a

prototype framework that could be utilised in further research. Later research could use qualitative approaches to explore information from different perspectives which are beneficial and applicable for a specific or local context.

11.3.3 Stakeholders and Factors within Undergraduate Dental Education

The study results represented the educator-curriculum from only two perspectives: educator and student. Although it can be argued that educators and students are the main stakeholders within UG-DentalEduc, the results do not yet reflect the whole of UG-DentalEduc. There are other stakeholders whose opinions are valuable for developing educators, including non-academic staff and local populations. Additionally, this study focused only on the factors relating to educators (e.g. academic position, roles and responsibilities). Other factors that potentially influence the educator-curriculum, such as resources and institutional policy, have not yet been explored. Therefore, future research is needed to consider these issues in order to discover broader perspectives that help implementing the educator-curriculum.

11.3.4 Dentistry: Do we need a specific curriculum for developing educators?

This project re-emphasised the notion raised in the literature that dentistry is a unique profession where learning can occur spontaneously during practice and involve several factors including patient welfare, complex materials and procedures, and irreversible outcomes. For this, an educator-curriculum needs to be specifically tailored for UG-DentalEduc. However, one might argue that the medical education discipline has already included all fundamental educational competences and these are applicable also to other healthcare professions including dentistry. Hence, it may not be necessary for dentistry to have a particular educator-curriculum. Although this research

project indicates that educators need to develop educational competences which are unique for teaching and learning in dentistry, it cannot fully explain 'why' dentistry needs a specific educator-curriculum.

For example, this study reveals that the item 'Assessment Calibration' is essential and also achieved 100% consensus (see Chapter 8). This reflects that in clinical dentistry all students work at a chairside (either being practitioners or assistants) and are divided into groups under supervision of different educators; hence, it requires all educators to possess similar standards for providing fair and reliable assessment. In this learning context, assessment calibration is a unique feature of dentistry. However, it can be contested that bedside teaching in medicine, where different groups of students learn in a hospital ward under supervision of different educators, share similar features with chairside teaching in dentistry. Thus, this learning context is not unique only to dentistry. This suggests that future research should focus on exploring the nature of dentistry and UG-DentalEduc, and explore how dentistry and dental education is different from other health professional education, especially medicine and medical education, in order to confirm the need for a practical educator-curriculum.

11.3.5 Strategies for Developing Educational Competences

Experiential learning and learning styles (see Chapter 4) can be used to explain that competences in teaching can be developed through experience as well as training. Educational principles learned in a training programme allow educators to grasp knowledge through 'abstract conceptualisation'; then they apply knowledge into real teaching practice, gain experience, and reflect on their practice in order to gain deep understanding of educational principles. However, some educators (especially senior educators who have much experience in teaching) have already attained good educational competences without being trained in educational principles. They gain and

accumulate teaching experience – 'concrete experience'; then they reflect on their experience in order to develop tacit knowledge and understand the teaching context, which helps them to apply new educational knowledge into different situations. Yet, while they are good at what they do, without further training they may be unaware of alternative educational strategies that would improve their teaching. This explanation indicates that educational principles and understanding of how to teach can be learned and developed through different approaches depending on the learning styles of educators. It also infers that educational theory and practice are intertwined, and should be.

Ideally, educators should not need to develop educational knowledge through trial and error (i.e. experimenting with what works or does not work). It may compromise student learning if educators use an inappropriate strategy as a part of their educational development; although, which strategies work may not be clear without trials and errors. This research study support this notion as the results revealed that educational principles (Domain 1) are important for educational practice in dentistry (Domain 2). It is coherent with previous studies that educators need to develop tacit educational knowledge (e.g. how adults learn), which will enable effective and efficient teaching. Hence, providing an educator-curriculum would better help educators develop educational competences.

However, there are more ways than one for developing educational competences, as there are many factors (e.g. learning styles, institutional needs) which still need consideration. Different strategies may work with different learners. Therefore, future research should focus on how to create the most appropriate and practical way to help educators develop their educational knowledge and competences.

11.4 Reflection

In this section I reflect on what I have experienced and learned from conducting this research study. As a researcher, I have followed a steep learning curve in my research skills. I started this research study with a lack of understanding in research philosophy and theoretical frameworks. Although philosophical considerations are important to all studies, these issues are sometimes perceived by dental professionals as irrelevant to dental research, because the nature of dentistry is scientific-based – where evidence and logical thinking are more dominant than values and beliefs. However, they were an important part of my research project because it focused on education and social factors (e.g. culture) relating to dentistry. I needed to explore these issues through independent study and by attending taught modules in social sciences. I have found that social science theories gave me better insight into dental education.

For example, an appreciation of critical theory allowed me to frame the scope of my research, develop research propositions, set research questions and objectives, and choose an appropriate methodology and method for collecting data. The Hofstede's cultural dimension model helped me explain why a particular teaching method in dentistry (such as PBL) seems to be beneficial in only specific European countries, but not in other countries. I also found that the model can be applied in other aspects of education, including learning styles; hence, I could better see relationships between different factors within the data and was able to develop better argument and discussion in my thesis.

However, one crucial point I have realised is that the Hofstede's model could not fully explain all the findings in my study. There are many factors which influence dental education, according to the literature, but I have not seen them in this study. I have realised that education is a complex and dynamic

process. Using only one approach and trying to understand education only from a cultural perspective, is not sufficient. In order to understand the nature of education, I could have explored and got involved in the setting myself. This is the reason why I suggest future research to employ different research philosophies that enable the use of qualitative approaches to further understand dental education and its components. I have learned that when conducting research, I need to be aware of the nature of the study and to be flexible enough to use different approaches in order to gain further understanding of the subject of study. Therefore, the key learning point as a researcher has been to be 'open to other approaches, to take account of context but not to conduct research in isolation.'

Epilogue

This study has identified an educator-curriculum of dental UG students in Europe. It reveals *what* educational competences educators need to develop, as well as *what* influences on the educator-curriculum. While previous literature has outlined a long list of educational competences for (dental) educators, this study adds new knowledge to this area by identifying a 'practical' curriculum that indicates both essential and context-specific content relating to the European context. The curriculum can be beneficial for other disciplines. However, the findings of this study should be systemically considered and all stakeholders need to be involved when applying the curriculum to other contexts. In order to gain benefits from this study, further research is needed, including the nature of dentistry and *how* to develop educational competences. Moreover, it also requires positive, constructive perceptions of educators and their development. Finally, it is hoped that this research project will be an initial step in the further development of European dental education.

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Appendix A

Initial analysis of literatures for

developing a Delphi questionnaire

Initial analysis of documents for developing a Delphi questionnaire

Document 1: Guidelines for Dental Educators: A framework for developing standards for educators of the dental team (Bullock and Firmstone, 2008).

Code	Detail	Initial Category
	Domain 1: Educational Theory and Best Practice	
	1. Dental educators know	
D1-01	➢ Understand the principles of learning theories (e.g. adult learning; behaviourism; cognitivism; and socio-cultural theories of learning)	Learning theories
D1-02	➢ Know about different approaches to curriculum and educational programme planning (e.g. outcomes based; competencies; objectives; process approach)	Curriculum and programme planning
D1-03	➢ Are familiar with the good practice related to different modes of educational delivery (e.g. lecture, small group, one-to-one, workplace based, hands-on, simulations, e-learning, and blended) and the responsibility learners have for their own learning	Modes of educational delivery
D1-04	➢ Understand the principles of inter- and multi-professional education and recognise when a differentiated approach to learning is required	Inter- and multi-professional education
	2. With the dental team as learners, dental educators do	
D1-05	➢ Use skills in critical thinking to draw on educational theory, published evidence and insights from best practice to inform educational delivery (e.g. encourage active participation, focus learning on real patient cases)	Use of educational theories/evidence
	3. With dental educators as learners, dental educators do	
D1-06	➢ Advise or train other dental educators in the application of educational theory, published evidence and best practice to inform educational delivery	Train educators on educational theories
	4. Dental educators lead	
D1-07	➢ Promote the application of educational theory to dental education and support best practice	Promote use of educational theories
D1-08	➢ Seek to provide evidence for the improvement of	

Supachai Chuenjitwongsa · Appendix A

	dental education and training by commissioning or leading research and development into the application of educational theory and best practice	Research and develop use of educational theories
	Domain 2: Learning and Teaching in the Workplace	
	1. Dental educators know	
D1-09	➤ Know that high quality, safe patient care always has priority	High quality patient care
D1-10	➤ Know the content of the learner's programme/curriculum, the required professional and clinical standards, and expected outcomes	Curriculum, Clinical standards
	2. With the dental team as learners, dental educators do	
D1-11	➤ Whilst putting the patient first, maximise opportunities to acquire relevant experience though case mix, treatments, clinical environment and contributions from the wider workplace team	Learning in the workplace
D1-12	➤ Discuss, plan and review individual learner's developing practice using reflective tools as appropriate	Support development by reflection
D1-13	➤ Teach and supervise learners, foster a workplace environment conducive to learning and encourage increasing professional responsibility	Teach and supervise in workplace
D1-14	➤ Model good clinical behaviour and professional attitudes, including keeping up-to-date with clinical skills and published evidence	Role model in workplace
	3. With dental educators as learners, dental educators do	
D1-15	➤ Advise, train or oversee other dental educators in the delivery of workplace-based education and training	Train educators on workplace-based education
	4. Dental educators lead	
D1-16	➤ Lead the strategic development of workplace-based dental education and training through liaison with service commissioners, providers, patients and their representatives and by implementing new and improved approaches	Develop workplace-based education
D1-17	➤ Constructively and sensitively challenge poor practice in the delivery of patient care arising from education and training in the workplace and work with others to improve patient and learner experience and outcomes	Support improvement of poor patient care

	Domain 3: Learning and Teaching Away from the Workplace	
	1. Dental educators know	
D1-18	➤ Know the content of the learner's programme/curriculum, the required professional and clinical standards, and expected outcomes	Curriculum and clinical standards
D1-19	➤ Understand ways to facilitate learner engagement (e.g. appropriate use of equipment, hand-outs, learning environment, timings, integration of audio-visual)	Facilitate learner
D1-20	➤ Understand the match between modes of delivery, content, the learner group and intended outcomes	Match teaching, content, and learner
	2. With the dental team as learners, dental educators do	
D1-21	➤ Devise course/programme outlines in line with curriculum requirements to meet learners' needs, ensuring outcomes are fit for purpose and support improvement in education, patient care and public health	Plan programme which match learners' needs and predefined outcomes
D1-22	➤ Prepare appropriate learning resources and educational materials (e.g. audio-visual aids, hand-outs, study guides)	Learning resources and educational materials
D1-23	➤ Adopt an appropriate mode to fit the content, learner group and intended outcomes, making best use of educational materials and informed by best practice	Appropriate mode for content, learner, educational materials
D1-24	➤ Ensure learners are aware of the aims, objectives, content and arrangements for courses/programmes, to enable maximum benefit and compliance with GDC CPD requirements	Ensure learners about course and its components
	3. With dental educators as learners, dental educators do	
D1-25	➤ Advise, train or oversee other dental educators in planning, preparing and delivering education away from the workplace	Train educators on education which away from workplace
	4. Dental educators lead	
D1-26	➤ Lead the strategic development of dental education away from the workplace, implementing new approaches and sharing best practice through informal and formal communications (e.g. publications)	Develop education which away from workplace
D1-27	➤ Promote, encourage and support the development of patient-centred learning and the appropriate	Patient-centred learning, inter- and

D1-28	use of inter-professional and multi-professional education ➤ Constructively and sensitively challenge poor practice in the delivery of education and training away from the workplace and work with others to improve learner experience and outcomes	multi-professional education Support improvement of poor patient care
	Domain 4: Assessing the Learner	
D1-29	1. Dental educators know ➤ Know the expected standards, assessment system or grading criteria	Standards, assessment, and grading criteria
D1-30	➤ Know about different formative and summative assessment instruments, their relationship to learning and their appropriate use (e.g. tools for identifying learning needs; workplace based assessments; assessments used outside the workplace; approaches to recording evidence)	Formative and summative assessment
D1-31	➤ Know the strengths and weaknesses of different assessment processes (e.g. systems of moderation, issues of reliability and validity, review and appeals processes)	Different assessment processes
D1-32	➤ Understand the principles of constructive feedback and how to use assessment results to inform future learning (including pathways for underperformers)	Constructive feedback
D1-33	2. With the dental team as learners, dental educators do ➤ Use appropriate assessment tools with learners, exchange constructive feedback, appropriately document outcomes and use assessment results to inform future learning	Assessment tools, constructive feedback, use of assessment result
D1-34	3. With dental educators as learners, dental educators do ➤ Advise, train or oversee other dental educators in assessment processes and/or how to exchange constructive feedback	Train educators on assessment processes and constructive feedback
D1-35	4. Dental educators lead ➤ Lead the strategic development and implementation of assessment processes and systems, encouraging and supporting colleagues and learners to be actively engaged	Develop assessment processes

	Domain 5: Guidance for Personal and Professional Development	
	1. Dental educators know	
D1-36	➤ Know about current educational and professional requirements for initial and continuing registration (e.g. the GDC Lifelong Learning scheme, CPD for DCPs)	Current educational and professional requirement Reflective practice, Skills for personal and professional development
D1-37	➤ Understand the educational value of reflective practice and know about the current tools and skills required to support personal and professional development planning	
D1-38	➤ Are familiar with the range of agencies and sources of information about personal and professional development and how to access relevant information	Personal and professional development
D1-39	➤ Know about local and national procedures related to clinical governance and poor performance	Clinical governance
	2. With the dental team as learners, dental educators do	
D1-40	➤ Provide one-to-one educational support and guidance to learners (e.g. by identifying learning needs, discussing CPD, providing informed careers advice and referring to other sources as appropriate) using a range of tools and skills (e.g. learning agreements, mentoring, personal development planning)	One-to-one educational support and guidance
D1-41	➤ Comply with GDC and NHS standards and guidance in relation to clinical governance and poor performance matters, seeking and acting on appropriate advice and support (both for themselves and their learners)	Local and national standards and guidance
	3. With dental educators as learners, dental educators do	
D1-42	➤ Advise, train or oversee other dental educators in how to support and guide different types of learners about personal and professional development	Train educators on personal and professional development
	4. Dental educators lead	
D1-43	➤ Lead the strategic development and promote a culture of personal and professional development	Develop personal and professional development
D1-44	➤ Whilst recognising that issues of patient safety are paramount, ensure that dental educators and learners are appropriately, transparently and fairly treated in matters of poor performance	Matters of poor performance

	Domain 6: Quality Assurance	
	1. Dental educators know	
D1-45	➤ Know about course evaluation tools and understand the roles of audit, evaluation and research	Course evaluation, Audit, Research
D1-46	➤ Know about local and national dental (and medical) quality assurance systems and processes (e.g. role of GDC, Deaneries and Dental Faculties of the Royal Colleges, PMETB and other professional bodies as applicable)	Local and national QA
D1-47	➤ Are familiar with associated terminology (e.g. quality assurance, quality management, quality control, governance)	Terminology which relate to quality matters
	2. With the dental team as learners, dental educators do	
D1-48	➤ Implement relevant local and national dental (and medical) quality assurance systems and processes	Implement QA
D1-49	➤ Seek to improve on their own educational performance by reflection, feedback from peers and learners, participation in audit and/or evaluation and informed by learner progress, as appropriate	Improve educational performance
D1-50	➤ Evaluate the educational programme (inputs, processes and outcomes) and record data for monitoring and audit purposes	Evaluate educational programme
D1-51	➤ Encourage learners to participate in audit, evaluation or research	Learners' participation: audit, evaluation and research
	3. With dental educators as learners, dental educators do	
D1-52	➤ Advise dental educators on their performance by using appropriate evaluation tools, informed by learner progress and clinical governance requirements	Support educators by evaluation tools
D1-53	➤ Through analysis of evaluation data, report to others, advising on areas for strategic development	Evaluation and development
D1-54	➤ Encourage, train or oversee other dental educators in audit and/or evaluation	Train educators on audit and evaluation
	4. Dental educators lead	
D1-55	➤ Lead the strategic development and implementation of quality assurance systems for dental education taking account of identified needs, clinical governance requirements and quality standards, initiating action as appropriate	Develop QA for dental education

	Domain 7: Management of Education and Training	
	1. Dental educators know	
D1-56	➢ Have an overview of the context and management structure of dental education and training in the UK and locally	Local dental education context and management
D1-57	➢ Understand what constitutes effective management, leadership and team-work	Management, Leadership, Team-work
D1-58	➢ Are familiar with the skills needed for effective management of dental education and training (e.g. self-awareness, organisational skills, decision making, budgeting, commissioning)	Effective management for dental education
D1-59	➢ Know about current requirements and best practice for fair recruitment and selection processes for educational programmes	Recruitment and selection processes
	2. With the dental team as learners, dental educators do	
D1-60	➢ Effectively manage resources for dental education including the development of proposals to meet curriculum requirements and the educational needs of learners, in liaison with others (e.g. providers, commissioners, medical/dental educators)	Manage resources for dental education
D1-61	➢ Ensure programme organisation is sensitive to issues of equality, diversity and opportunity	Organisation, Equality, Diversity, Opportunity
D1-62	➢ Manage dental educator input (e.g. commissioning courses, arranging speakers, organising workplace based experience, training placements, managing budgets)	Dental education input
D1-63	➢ Recruit and select learners for educational programmes, fairly and appropriately	Recruitment and selection processes
D1-64	➢ Participate in local and/or national committees, organisations and discussion groups on dental education	Local/national organisations and discussion groups
	3. With dental educators as learners, dental educators do	
D1-65	➢ Advise, train or oversee other dental educators in the management of dental education and training (e.g. programme planning, fair recruitment)	Train educators on management of dental education
	4. Dental educators lead	
D1-66	➢ Oversee change and lead the strategic development of dental education and training taking into account local and national priorities, needs and resources, and sensitive to issues of	Change and development of dental education

	equality, diversity and opportunity	
D1-67	➤ Fairly recruit, select, manage and lead dental educators ensuring they are properly supported in their role by workload management systems, resources, induction and professional development	Dental educator management (HR issues)
D1-68	➤ Lead the development of funding applications to support improvements in dental education and training	Funding the dental education
D1-69	➤ Instigate or positively contribute to national and local policy development for education and training through participation in Deanery, NHS and professional committees and organisations	Local/national policy development
	Domain 8: Professionalism 1. Dental educators know	
D1-70	➤ Understand the relevant guidance related to ethical and professional conduct (e.g. GDC Standards for Dental Professionals)	Professional ethics and conduct
D1-71	➤ Understand that others look to them to model good standards of professional behaviour	Professional behaviour and standards
D1-72	➤ Be aware of sensitive issues concerned with equity and diversity	Equity and diversity
	2. With the dental team as learners, dental educators do	
D1-73	➤ Adopt a professional approach to their educational role and seek feedback to develop their own strengths and address weaknesses (e.g. through participation in personal development planning, appraisal, CPD)	Development of educational role
D1-74	➤ Adopt a positive attitude to their educational role (e.g. are flexible, enthusiastic, motivate others, show respect for and interest in learners, promote the pursuit of high quality dental care; demonstrate commitment to the role)	Positive attitude toward educational role
D1-75	➤ Adopt an ethical approach in their educational role (e.g. are fair, non-discriminatory, show integrity, recognise their responsibilities to patients, colleagues, employers/commissioners, are aware of the boundaries of disclosure and confidentiality, appreciate diversity and equality)	Ethical approach in educational role
D1-76	➤ Employ good communication skills and work well in teams (e.g. listen, respond appropriately, demonstrate clarity in verbal and written form, are accessible, approachable and cooperative with colleagues)	Communication skills, Team-work

D1-77	➤ Demonstrate commitment to dental education through their own on-going formal education, training and appropriate professional or academic qualifications	Commitment to dental education
	3. With dental educators as learners, dental educators do	
D1-78	➤ Advise or train other dental educators on the expected standards of professional behaviour and attitudes and how these could be achieved	Train educators on professionalism
	4. Dental educators lead	
D1-79	➤ Lead on the development of a culture of professionalism in dental education	Develop professionalism in dental education

Document 2: Identification of Competencies for Effective Dental Faculty (Hand, 2006).

Note   Only competencies for the scholarship of teaching and learning are analysed.

Code	Detail	Initial Category
	Foundation Competencies	
D2-01	➢ Display an enthusiasm for teaching and support of students	Enthusiasm for teaching
D2-02	➢ Demonstrate expert-level skills and knowledge of topic/discipline	Knowledge and skills of discipline
D2-03	➢ Demonstrate an awareness of a variety of student learning styles and adapt teaching methods effectively	Learning styles and teaching methods
D2-04	➢ Apply outcomes- and competency-based education concepts that foster critical thinking and problem-solving skills	Outcome- and competency-based education
D2-05	➢ Model the use of evidence-based criteria and apply the science that supports dental practice in teaching settings	Evidence-based dentistry
D2-06	➢ Facilitate and manage individual and small group dynamics	Facilitate learning
D2-07	➢ Model an appreciation for cultural competency	Cultural competency
D2-08	➢ Participate and function effectively in interdisciplinary teams	Interdisciplinary teams
D2-09	➢ Demonstrate effective listening and communication skills	Communication skills
D2-10	➢ Model ethical and professional behaviours	Ethics and professionalism
D2-11	➢ Provide a safe learning environment	Learning environment
	Major Competencies	
	1. Plan and evaluate teaching/learning experiences	
D2-12	➢ Identify learner needs while recognizing diversity in learning styles	Learner's needs
D2-13	➢ Define learning outcomes/objectives appropriate for the setting and stage of student development	Learning outcomes and objectives
D2-14	➢ Determine most effective teaching strategies and learning experiences to accomplish outcomes/objectives using evidence-based criteria	Effective teaching strategies and learning experience
D2-15	➢ Identify appropriate content to build on previous knowledge and skills	Identify learning contents
D2-16	➢ Sequence content effectively to meet outcomes	Sequence content
D2-17	➢ Develop a course syllabus	Course syllabus
D2-18	➢ Create an appropriate learning environment	Learning

		environment
D2-19	➤ Direct learners to appropriate technology and information sources	Technology and information source
D2-20	➤ Develop or select appropriate instructional materials	Instruction materials
D2-21	➤ Choose appropriate course evaluation instruments	Course evaluation
D2-22	➤ Modify teaching/learning experiences in response to feedback	Modify teaching and learning from feedback
	2. Teach in a variety of settings: large group	
D2-23	➤ Choose appropriate material for large group learning experiences	Material for large group learning
D2-24	➤ Prepare an organized presentation that builds on students' previous knowledge, conforms to course objectives, and links to future learning objectives	Deliver large group teaching
D2-25	➤ Demonstrate effective communication and presentation skills, including the incorporation of active learning strategies	Communication and presentation skills, Active learning
D2-26	➤ Develop effective support material and effectively use support media	Educational material and media
	3. Teach in a variety of settings: small group	
D2-27	➤ Choose appropriate small group teaching methods	Small group
D2-28	➤ Select or develop appropriate supplementary materials	Learning materials
D2-29	➤ Facilitate discussion, frame broad questions, and engage all students in the integration and application of previous knowledge	Facilitate learning
D2-30	➤ Recognize the characteristics of a dysfunctional group and intervene appropriately	Intervention in dysfunctional group
D2-31	➤ Keep groups on task to achieve desired outcomes	Facilitate group
D2-32	➤ Assess student progress using established criteria	Assess student progress
	4. Teach in a variety of settings: one-on-one	
D2-33	➤ Identify and correct technical/dexterity problems and errors in application of knowledge	Technical problem and error
D2-34	➤ Develop structured remediation	Remediation
D2-35	➤ Provide academic and professional mentoring and advice	Mentoring
	5. Teach in a variety of settings: preclinical	
D2-36	➤ Assess students' level of psychomotor skill development	Psychomotor skills assessment
D2-37	➤ Understand the stages of psychomotor skills development	Psychomotor skills development
D2-38	➤ Demonstrate technical/psychomotor skills	Teaching psychomotor skills

D2-39	➢ Verbally describe the components of technical skill	Communication
D2-40	➢ Identify sources of student difficulty with skill acquisition and develop strategies to address appropriately	Identify skill acquisition
D2-41	➢ Provide feedback based on valid criteria	Giving feedback
D2-42	➢ Encourage self-assessment of skills development	Self-assessment
D2-43	➢ Develop methods for calibration of instructors	Calibration of instructors
D2-44	➢ Develop instructional materials appropriate for beginners and novices	Instructional materials
D2-45	➢ Facilitate the integration of previous knowledge to the procedures performed	Integration of knowledge and practice
	6. Teach in a variety of settings: clinical	
D2-46	➢ Understand and apply institutional clinical protocol and policy	Clinical protocol and policy
D2-47	➢ Model appropriate practices, attitudes, interpersonal skills, and ethical behaviour in the delivery of patient-centred care	Role model in clinic
D2-48	➢ Teach appropriate respect for patient autonomy and patient confidentiality	Patient-centred care
D2-49	➢ Demonstrate the ability to work as part of an interdisciplinary team for patient care	Interdisciplinary team
D2-50	➢ Teach decision-making skills, provide decision-making experiences, and guide students to correct decisions	Teach higher-ordered thinking skills
D2-51	➢ Demonstrate appropriate technical clinical skills	Clinical skills
D2-52	➢ Identify sources of student difficulty and develop strategies to address appropriately (remediate)	Identify student's problem, Remediation
D2-53	➢ Facilitate the development of critical thinking skills through appropriate questioning strategies	Higher-ordered thinking skills
D2-54	➢ Integrate basic biomedical and clinical science principles into patient care	Apply knowledge into practice
D2-55	➢ Provide constructive feedback	Giving feedback
D2-56	➢ Maintain a learning environment that is respectful of both patients and students while maintaining patient confidence in student-clinician	Learning environment in clinical education
D2-57	➢ Foster self-assessment of outcomes of clinical procedures	Self-assessment
D2-58	➢ Assess students' performance using valid criteria and standardized methods	Performance assessment
	7. Teach in a variety of settings: laboratory	
D2-59	➢ Assess student's understanding of task and relationship to clinical outcome	Assess knowledge
D2-60	➢ Demonstrate technical skills	Technical skills
D2-61	➢ Provide constructive feedback	Giving feedback

D2-62	➢ Encourage self-assessment	Self-assessment
	8. Teach in a variety of settings: distance/continuing education	
D2-63	➢ Select topics of relevance to practitioners	Learning topics
D2-64	➢ Prepare presentation that builds on knowledge obtained in dental school	Prepare presentation
D2-65	➢ Present strategies for incorporation of new information into practice	Apply new information into practice
	9. Assess student performance	
D2-66	➢ Articulate purpose of assessment	Assessment purpose
D2-67	➢ Choose appropriate assessment methods based on objectives	Assessment methods
D2-68	➢ Facilitate learner's self-assessment	Self-assessment
D2-69	➢ Design assessment instruments appropriate to the material, setting, and students	Design assessment instruments
D2-70	➢ Evaluate validity and reliability of assessment instruments	Assessment instruments
D2-71	➢ Set appropriate standards	Set standards
D2-72	➢ Understand the importance of calibration; conduct and analyse calibration exercises	Calibration of assessment
D2-73	➢ Provide appropriate feedback	Giving feedback
D2-74	➢ Design remediation based on assessment	Remediation
	10. Plan and evaluate curriculum	
D2-75	➢ Articulate curriculum goals	Curriculum goals
D2-76	➢ Develop a curriculum management plan and modify curriculum goals to reflect current standards of practice and accreditation standards	Curriculum planning, Standards, QA
D2-77	➢ Understand and apply principles of promoting and managing change in an academic environment	Educational change
D2-78	➢ Understand and apply the principles of instructional design	Instructional design
D2-79	➢ Understand and apply principles of curriculum planning	Curriculum planning
D2-80	➢ Use dental education research and literature sources	Dental education research
D2-81	➢ Develop evaluation plan to assess the attainment of curricular goals	Evaluation plan
D2-82	➢ Engage all faculty in curriculum evaluation	Curri. Evaluation
D2-83	➢ Regularly solicit student evaluation and input	Curri. Evaluation

Document 3: The good teacher is more than a lecturer – the twelve roles of the teacher (Harden and Crosby, 2000).

Code	Detail	Initial Category
	Teacher's Roles	
	1. Information Provider	
D3-01	➢ Lecture in classroom setting	Lecture
D3-02	➢ Teacher in clinical or practical class setting	Clinical teaching
	2. Role Model	
D3-03	➢ On-the-job role model (e.g. in clinics, ward rounds, etc.)	Role model in clinic
D3-04	➢ Role model in the teaching setting	Role model in teaching setting
	3. Facilitator	
D3-05	➢ Mentor, personal advisor or tutor to a student or group of students	Mentor
D3-06	➢ Learning facilitator, e.g. supporting students' learning in problem-based learning small groups in the laboratory, in the integrated practical class sessions or in the clinical setting	Facilitate learning
	4. Examiner	
D3-07	➢ Planning or participating in formal examinations of students	Assess student
D3-08	➢ Curriculum evaluator – evaluation of the teaching programme and the teachers	Curriculum evaluation
	5. Planner	
D3-09	➢ Curriculum planner, participating in overall planning of the curriculum, through for example, curriculum planning committees such as the Undergraduate Medical Education Committee	Curriculum development and planning
D3-10	➢ Course organiser, responsibility for planning and implementing a specific course within the curriculum. This may, for example, relate to one system or one theme, or to a special study module.	Organise course
	6. Resource Provider	
D3-11	➢ Production of study guides to support the students' learning in the course	Study guides
D3-12	➢ Developing learning resource materials in the form of computer programmes, videotape or print which can be used as adjuncts to the lectures and other sessions	Learning resources and materials

Document 4: Academic Competencies for Medical Faculty (Harris, et al. 2007).

Code	Detail	Initial Category
	Core Competencies for Family Medicine Educators	
	1. Leadership	
D4-01	➢ Exhibit integrity, knows self, recognises and accepts strengths and weaknesses in self and in others	Self-awareness
D4-02	➢ Communicates clearly, openly, honestly, and concisely	Communication
D4-03	➢ Listens to individual's perspectives and encourages individual's initiative and growth	Listening to others
D4-04	➢ Resolves conflicts, negotiates well, foster collaboration and cooperation	Conflict resolving, Negotiation
D4-05	➢ Establishes trust, values diverse perspectives and talent	Trust, Diversity
D4-06	➢ Encourages individual initiative, mentors individuals to achieve success	Encouraging, Mentoring
	2. Administration	
D4-07	➢ Communicates effectively in oral, written, and electronic form	Communication
D4-08	➢ Uses technology relevant to one's job	Use of Technology
D4-09	➢ Identifies personal style preferences and how to interact with others	Personal interaction
D4-10	➢ Manages time, sustains one's well-being, balances work and personal needs	Time management
D4-11	➢ Conducts effective meetings with clear agenda and action plan	Organise meeting
D4-12	➢ Plans a career strategy and accurately assesses one's strengths and weaknesses	Career planning
D4-13	➢ Works within the confines of mission-based management	Mission-based management
D4-14	➢ Understands ethical underpinnings of one's job and acts accordingly	Career ethics
	3. Teaching	
D4-15	➢ Demonstrates content knowledge	Content knowledge
D4-16	➢ Organizes and conveys major teaching points at a level appropriate to audience	Deliver teaching
D4-17	➢ Engages learners, keeps on task, avoids domination	Engage learners
D4-18	➢ Solicits questions, summarizes main points to reinforce learning	Questioning, Summarising
D4-19	➢ Identifies learner needs	Learner needs
D4-20	➢ Negotiates learning objectives and selects	Appropriate

	appropriate teaching methods	teaching methods
D4-21	➢ Presents a lecture on a clinical or educational topic	Deliver lecture
D4-22	➢ Enhances presentation with effective audio-visual aids and hand outs	Educational media and materials
D4-23	➢ Designs and uses evaluation to make improvements	Evaluation
D4-24	➢ Uses learner strengths and deficiencies to establish future learning activities	Support learner's development
D4-25	➢ Demonstrates one-on-one teaching	One-on-one
D4-26	➢ Facilitates small-group sessions	Small-group
	4. Research	
D4-27	➢ Teaches skills of accessing, analysing, and applying medical literature to clinical practice	Research skills
D4-28	➢ Role models the practice of evidence-based medicine for learner	Evidence-based medicine, Role model
D4-29	➢ Becomes an expert in a body of knowledge	Knowledge expertise
D4-30	➢ Formulates researchable questions; designs, collects, and analyses data	Research processes
D4-31	➢ Evaluates findings and draws conclusions based upon findings	Evaluate research
D4-32	➢ Participates actively as a member of a research team, including statistical consultants	Research team
D4-33	➢ Adheres to guidelines and regulations regarding the ethical conduct of research and use of human subjects	Research ethics
D4-34	➢ Balances competing faculty obligations to achieve research goals	Balance roles to support research
	5. Medical Informatics	
D4-35	➢ Reads and accesses medical literature on the World Wide Web	Access to medical literature
D4-36	➢ Evaluates medical literature and translates into clinical and professional practice	Evaluate and apply literature
D4-37	➢ Demonstrates basic computer knowledge and skills, utilization of hardware and software	Computing skills
D4-38	➢ Demonstrates communication skills using e-mail, networking, centralized and distributed integrated systems, multimedia work stations, medical language and classification, database management systems	Using technology for communication
D4-39	➢ Understands, teaches, and practices evidence-based medicine	Evidence-based medicine

	6. Care Management	
D4-40	➢ Discusses the history and financing of health care, principles of cost control, and resource allocation	Financing health care
D4-41	➢ Defines principles of shared financial risk among provider, patient, and payer	Financial risk in health care
D4-42	➢ Discusses increased provider accountability for quality of care delivered, role of reimbursement in influencing care decisions	Health care quality
D4-43	➢ Teaches vocabulary and principles for effective functioning in managed care organizations (MCOs) and integrated health systems	Health care system and function
D4-44	➢ Acquaints learners with models for assessing performance and delivery	Performance assessment
D4-45	➢ Explains and implements utilisation review concepts	Review concepts
D4-46	➢ Explains and applies concepts of cost-benefit analysis to determine best quality of care at minimum cost	Cost-benefit analysis
D4-47	➢ Describes the barriers to health care access	Barrier to health care
	7. Multiculturism	
D4-48	➢ Promotes individual self-awareness of multicultural differences and practices non-judgmental interactions at all levels of medical training and practice	Self-awareness, Multicultural differences
D4-49	➢ Describes changing demographics of various populations locally and nationally	Demographic change
D4-50	➢ Identifies the cultural epidemiology of health and illness problems of specific ethnic groups	Cultural epidemiology
D4-51	➢ Meets defined local health needs of selected minority, ethnic, and at-risk populations	Local health needs
D4-52	➢ Discusses the effects of cultural perspectives on medicine, health, illness-seeking behaviour	Cultural medicine/health
D4-53	➢ Advocates for cultural competence in health care organizations and professional groups	Cultural competences
	Competencies Required for Specific Family Medicine Roles	
	1. Leadership	
D4-54	➢ Develops a shared vision	Shared vision
D4-55	➢ Discusses how program priorities and goals relate to institutional mission	Institution goals/missions
D4-56	➢ Accepts different perspectives/approaches, balances individual success with team success, can work with a variety of individuals	Diversity
D4-57	➢ Builds teams and balances individual success with team success	Team building
D4-58	➢ Establishes clear goals, invites input, weighs evidence, and acts accordingly	Institutional function

	2. Administration	
D4-59	➢ Develops and implements a system-wide change and measures effectiveness of intervention	Develop and implement change
D4-60	➢ Develops and operates within the constraints of a budget	Budget
D4-61	➢ Demonstrates fiscal responsibility and attention to values in managing a project/program/grant	Managing programme
D4-62	➢ Demonstrates skills in grant writing and resource acquisition	Grant writing
D4-63	➢ Intervenes effectively with a challenging employee or subordinate	Human resource management
D4-64	➢ Creates supportive environment for self-improvement and organizational growth	Organisational environment
D4-65	➢ Describes environmental pressures on health science centre/residency program and effects on faculty roles and functions	Organisational environment
	3. Teaching	
D4-66	➢ Demonstrates bedside teaching	Bedside teaching
D4-67	➢ Prepares and introduces patient and learner	Patients in teaching
D4-68	➢ Demonstrates skills in physical exam and patient interaction	Clinical examination skills
D4-69	➢ Observes and solicits questions from patients	Solicit questions
D4-70	➢ Evaluates learning and provides feedback for further patient assignments	Assess learning, Giving feedback
D4-71	➢ Identifies and analyses teaching and learning styles	Teaching and learning styles
D4-72	➢ Manages difficult learners and dysfunctional behaviour in one-to-one and small-group teaching	Difficult learners, Dysfunctional behaviours
D4-73	➢ Implements different evaluation methods (NBME shelf exams; modified essay questions; problem-based learning exercises; OSCEs and standardized patient vignettes; computer-based examinations; self-assessment; peer, preceptor, staff, and patient evaluation	Assessment methods
	4. Curriculum Development	
D4-74	➢ Conducts a needs assessment that includes program and learner needs	Needs assessment
D4-75	➢ Designs a curriculum or program that includes development of learner	Curriculum design
D4-76	➢ Determines program content	Programme content
D4-77	➢ Develops instructional materials that best facilitate learning	Instructional materials
D4-78	➢ Evaluates instruction and translates learning objectives to competency	Objectives, Competencies

D4-79	➢ Uses evaluation information to make changes in the course/program	Programme evaluation
	5. Research	
D4-80	➢ Communicates research results to professional audiences by peer-reviewed abstracts, posters, oral presentations, and publications	Communicate research result
D4-81	➢ Creates supportive research infrastructure and environment	Research environment
D4-82	➢ Promotes research and scholarly activities within the academic unit, hospital, medical school, and/or university	Promote research
D4-83	➢ Prepares research proposals	Research proposal
D4-84	➢ Leads research skill development among faculty, residents, and students	Develop research skills among stakeholders
D4-85	➢ Values research in decisions affecting annual reviews and promotion/tenure	Research value
D4-86	➢ Locates funding sources	Research funding
D4-87	➢ Participates in professional societies and networks with similar research interests	Research networks
D4-88	➢ Role models, mentors, and actively teaches research skills to students, residents, and faculty	Teaching research skills
D4-89	➢ Manages all phases of research projects (timelines, budget, personnel)	Research management
	6. Medical Informatics	
D4-90	➢ Teaches principles of medical reasoning, decision making, probability, and evaluation of decision-making systems	Teaching higher-ordered thinking skills
D4-91	➢ Defines quality analysis, resource indicators, activity monitors, productivity	Critical appraisal
D4-92	➢ Discusses clinical informatics, including quality, accuracy, and interpretation of medical data variables	Critical appraisal
D4-93	➢ Utilizes office computers, including practice management systems, computerised medical records, and analysis of clinical activity	IT in practice management
	7. Care Management	
D4-94	➢ Develops evaluation methods for MDs in training to reflect performance standards generated by health care delivery systems	Assess student's performance
D4-95	➢ Teaches contract review and negotiations	Contract review
D4-96	➢ Demonstrates how to function effectively in a managed care environment while preserving the educational mission	Workplace-based education
D4-97	➢ Balances needs of the individual/family with those of the community while providing patient-centred	Patient-centred care

	care	
D4-98	8. Multiculturism ➢ Performs culturally sensitive histories and physical examinations	Cultural sensitivities
D4-99	➢ Works with family, translators, and complementary medical practitioners, treatment plan	Work with different people

Document 5: A framework for developing excellence as a clinical educator (Hesketh, et al. 2001).

Code	Detail	Initial Category
	What the doctor as a teacher is able to do	
	1. Teaching large and small group	
D5-01	➤ Prepare a lecture	Prepare lecture
D5-02	➤ Deliver a lecture	Deliver lecture
D5-03	➤ Use audio-visual aids, including electronic presentations, appropriately	Educational media
D5-04	➤ Obtain audience participation	Audience participation
D5-05	➤ Choose appropriate small group teaching methods	Small group
D5-06	➤ Run a small group teaching session	Small group
D5-07	➤ Organise and run video and teleconference	Video/teleconference
	2. Teach in a clinical setting	
D5-08	➤ Teach clinical and practical skills	Clinical /practical skills teaching
D5-09	➤ Teach appropriate attitude	Attitude teaching
D5-10	➤ Teach decision-making skills	Thinking skill teaching
D5-11	➤ Teach in ward, theatre and related areas	Teaching in workplace
D5-12	➤ Teach in the clinic	Clinical teaching
D5-13	➤ Teach "on-take"	On-take teaching
D5-14	➤ Teach in the community	Teaching in community
D5-15	➤ Teach in a clinical skills unit	Teaching in clinical skill unit
D5-16	➤ Act as a role model	Role model
	3. Facilitate and manage learning	
D5-17	➤ Carry out appraisal of learner and prepare report	Appraise learner
D5-18	➤ Assist learners in achieving the stated learning outcomes	Support learner
D5-19	➤ Assist learners to reflect on their experiences, e.g. through questioning and feedback	Reflection
D5-20	➤ Direct learners to appropriate information and human resources	Information and resources
D5-21	➤ Assist learners in self-assessment skills	Self-assessment
D5-22	➤ Develop learning contracts	Learning contract
D5-23	➤ Motivate learners	Motivate learner
D5-24	➤ Counsel learners on career	Counselling
D5-25	➤ Counsel learners on personal matters	Counselling
D5-26	➤ Counsel learners on aspects of learning and study skills	Counselling
D5-27	➤ Assist learners to organise their knowledge and	Organise

	experiences	knowledge
D5-28	➢ Assist learners to make appropriate use of information technology	Assist use of IT
	4. Plan learning	
D5-29	➢ Undertake an assessment of learners' needs	Learning needs assessment
D5-30	➢ Define the learning outcomes expected	Learning outcomes
D5-31	➢ Specify the content of the programme	Programme content
D5-32	➢ Design teaching strategies and learning experiences to match the outcomes	Teaching strategies, Learning experience
D5-33	➢ Prepare a learning plan with timescale	Learning plan
D5-34	➢ Create an appropriate learning environment	Learning environment
D5-35	➢ Integrate different elements of the programme	Programme
D5-36	➢ Implement planned course	Course implementing
	5. Develop and work with learning resources	
D5-37	➢ Design instructional text including hand outs, handbooks and protocols	Instructional materials
D5-38	➢ Make appropriate use of study guides	Study guides
D5-39	➢ Design effective study guides	Study guides
D5-40	➢ Make appropriate use of videotapes	Use of videotape
D5-41	➢ Contribute to the preparation of multimedia learning packages	Multimedia learning
D5-42	➢ Use multimedia learning resources	Multimedia learning
D5-43	➢ Use the internet for teaching	Teaching-internet
D5-44	➢ Plan, and advise learners on the effective use of library facilities	Use of library
D5-45	➢ Make appropriate use of clinical simulator	Clinical simulator
	6. Assess trainees	
D5-46	➢ Choose appropriate assessment instrument	Assessment instrument
D5-47	➢ Use portfolios	Portfolio
D5-48	➢ Use written assessments	Written assessment
D5-49	➢ Assess performance at clinical examination	Performance assessment
D5-50	➢ Produce and interpret learner profiles	Learner profiles
D5-51	➢ Set appropriate standards	Standard setting
D5-52	➢ Facilitate learners' self-assessment	Self-assessment
D5-53	➢ Make appropriate use of computers in assessment	Computer in assessment
D5-54	➢ Assess learners for admission to the educational programme	Admission to the programme
	7. Evaluate courses and undertake research in education	

D5-55	➤ Use a range of tools for evaluating courses	Course evaluation
D5-56	➤ Use a range of tools for evaluating teachers	Teacher evaluation
D5-57	➤ Use a range of tools for evaluating resource materials	Resource material evaluation
D5-58	➤ Encourage research in medical education using sound educational research techniques	Educational research
	How the doctor approaches their teaching	
	8. With understanding of principles of education	
D5-59	➤ Theories of learning	Learning theories
D5-60	➤ Learning styles	Learning styles
D5-61	➤ On-the-job learning	On-the-job learning
D5-62	➤ Opportunistic learning	Opportunistic learning
D5-63	➤ Problem-based learning/task-based learning	PBL
D5-64	➤ Cooperative learning	Cooperative L
D5-65	➤ Small group dynamic	Small group
D5-66	➤ Principle of instructional design	Instructional design
D5-67	➤ New learning technologies	Learning technologies
D5-68	➤ Principle of curriculum planning	Curriculum
D5-69	➤ Outcome-based education	OBE
D5-70	➤ Multiprofessional education	Multiprofessional education
D5-71	➤ Distance learning	Distance learning
D5-72	➤ Principle of assessment and feedback	Assessment and feedback
D5-73	➤ Principle of change	Principle of change
	9. With appropriate attitudes, ethical understanding and legal awareness	
D5-74	➤ Enthusiasm	Enthusiasm
D5-75	➤ Empathy and interest in learners	Empathy
D5-76	➤ Respect for student	Respect for student
D5-77	➤ Openness	Openness
D5-78	➤ Avoid discriminatory actions	Discrimination
D5-79	➤ Confidentiality	Confidentiality
D5-80	➤ Impartiality	Impartiality
D5-81	➤ Respect for institutional goals	Institutional goals
D5-82	➤ Values teaching role	Teaching role
D5-83	➤ Demonstrates intellectual curiosity	Intellectual curiosity
D5-84	➤ Training regulations	Training regulations
D5-85	➤ Grievance and disciplinary procedures	Grievance/Disciplinary procedures
	10. With appropriate decision-making skills and best evidence-based education	
D5-86	➤ Use evidence-based medical education as the	Evidence-based

D5-87	basis for teaching and learning strategies adopted ➢ Familiarity with literature sources on medical education	medical education Literature sources
D5-88	➢ Is creative and resourceful in their teaching approach	Creative teaching
D5-89	➢ Is able to prioritise workload as teacher	Balance workload
	The doctor as a professional teacher 11. The role of teacher or trainer within the Health Service and the university	
D5-90	➢ Understanding teaching responsibilities	Teaching responsibilities
D5-91	➢ Maintain an acceptable balance between service commitments, research and teaching	Balance roles
D5-92	➢ Accept appropriate personal attributes for teachers	Personal attributes
D5-93	➢ Appreciate teacher as researcher	Teacher-researcher
D5-94	➢ Appreciate doctor as manager of teaching including quality control	Management, QA
D5-95	➢ Appreciate doctor as a teacher and learner of a multiprofessional team	Multiprofessional team
D5-96	➢ Encourage a multiprofessional approach to clinical teaching	Multiprofessional approach
D5-97	➢ Appreciate and respect colleagues	Respect colleague
D5-98	➢ Familiarity with teaching recommendations and requirements of the GMC, the specialties and the university	Teaching recommendation and requirement
	12. Personal development with regard to teaching	
D5-99	➢ Reflect upon and be aware of own strengths and weaknesses as a teacher	Career reflection
D5-100	➢ Accept and respond to evaluation comments, constructive criticism, etc. from others	Respond to evaluation/criticism
D5-101	➢ Keep abreast of new teaching and learning techniques	Update teaching and learning techniques

Document 6: Professional Standards 2012 (AoME, 2011).

Code	Detail	Initial Category
	Core Values for Medical Educators	
	1. Professional Integrity	
D6-01	➢ Works within a coherent professional framework relevant to medical education	Professional framework
D6-02	➢ Complies with relevant professional standards of practice	Professional standards
D6-03	➢ Is an advocate for medical education	Advocate for medical education
D6-04	➢ Reflects upon his or her own professional identity and develops an educational philosophy	Professional development
	2. Educational Scholarship	
D6-05	➢ Is active in his or her own professional development as a medical educator	Professional development
D6-06	➢ Is committed to enhancing the practice of medical education through analysis and reflection	Enhancing medical education
D6-07	➢ Advances medical education through scholarly endeavours	Advancing medical education
	3. Equality of Opportunity and Equality	
D6-08	➢ Ensures equality of opportunity for patients, students, trainees, staff and colleagues	Equality
D6-09	➢ Actively promotes and respects diversity in discharging his or her educational responsibilities	Diversity
	4. Respect for the Public	
D6-10	➢ Balances the needs of high quality service delivery with the needs of high quality medical education	Service quality, Educational quality
D6-11	➢ Committed to providing safe and effective learning at all times	Safe and effective learning
	5. Respect for Patients	
D6-12	➢ Acts with due consideration for the emotional, physical and psychological wellbeing of patients including maintaining the dignity and safety of patients at all times when discharging educational duties	Patient-centred approach
D6-13	➢ Through medical education, enhances the care of patients	Enhance patient care
	6. Respect for Learners	
D6-14	➢ Acts with due consideration for the emotional, physical and psychological wellbeing of learners	Respect learners
D6-15	➢ Supports learners in their personal and	Support learner's

D6-16 D6-17	professional development 7. Respect for Colleagues ➢ Acts with due consideration for the emotional, physical and psychological wellbeing of colleagues ➢ Supports colleagues in their personal and professional development	development Respect colleagues Support colleague's development
	Domain 1: Design and planning of learning activities **Element 1.1 – Learning and Teaching Principle**	
D6-18 D6-19	1. Standard Level 1 ➢ Shows how the principles of learning and teaching are incorporated into educational developments ➢ Is aware of different ways of learning and teaching	Teaching and learning principle Different educational methods
D6-20 D6-21	2. Standard Level 2 ➢ Applies learning and teaching principles in the design of a unit, module or subject area ➢ Matches course design to support different ways of learning and teaching	Apply teaching and learning principle Different educational methods
D6-22	3. Standard Level 3 ➢ Applies learning and teaching principles in the design of a curriculum for a whole course or degree programme	Apply teaching and learning principle
	Element 1.2 – Learning Needs	
D6-23	1. Standard Level 1 ➢ Shows how the needs of learners are considered	Learner's needs
D6-24	2. Standard Level 2 ➢ Gathers and interprets basic information on the needs of learners	Learning needs analysis
D6-25	3. Standard Level 3 ➢ Conducts complex learning needs analyses including those of learners, groups, professions or healthcare systems	Learning needs analysis
	Element 1.3 – Learning Outcomes	
D6-26	1. Standard Level 1 ➢ Is aware of the need to define what is to be learned	Learning objectives

D6-27	2. Standard Level 2 ➢ Constructs appropriate learning outcomes that can be measured or judged	Learning outcomes
D6-28	3. Standard Level 3 ➢ Defines learning outcomes within theoretical frameworks	Learning outcomes
	Element 1.4 – Learning And Teaching Methods and Resources	
D6-29	1. Standard Level 1 ➢ Is aware of a range of learning methods, experiences and resources and how they may be used effectively	Educational methods and resources
D6-30	2. Standard Level 2 ➢ Matches learning methods, experiences and resources to intended outcomes	Methods and resources
D6-31	➢ Develops learning resources for planned courses	Learning resource
D6-32	3. Standard Level 3 ➢ Is adaptive and effective in securing resources and dealing with constraints	Learning resource
	Element 1.5 – Evaluation of Educational Interventions	
D6-33	1. Standard Level 1 ➢ Responds appropriately to feedback and evaluation of educational interventions	Feedback, Intervention
D6-34	2. Standard Level 2 ➢ Evaluates and improves educational interventions	Evaluation, Intervention
D6-35	3. Standard Level 3 ➢ Conducts, interprets, acts on and disseminates evaluations of learning programmes	Programme evaluation
	Domain 2: Teaching and supporting learners **Element 2.1 – Delivering Teaching**	
D6-36	1. Standard Level 1 ➢ Appropriately uses a range of learning and teaching methods and technologies	T/L methods and technologies

D6-37	2. Standard Level 2 ➢ Appropriately uses a broad range of learning and teaching methods and technologies	T/L methods and technologies
D6-38	3. Standard Level 3 ➢ Is adaptive and innovative in respect to learning and teaching ➢ Supports others to innovate	Adapt/innovate T/L Support innovation
D6-39	**Element 2.2 – Maintaining an Effective Learning Environment**	
D6-40	1. Standard Level 1 ➢ Aware of the importance of establishing a safe and effective learning environment	Learning environment
D6-41	2. Standard Level 2 ➢ Establishes an effective learning environment ➢ Provides educational, personal and professional support in relevant contexts	Learning environment Educational support
D6-42	3. Standard Level 3 ➢ Monitors and manages complex learning environments ➢ Proactively seeks to improve the learning environment	Learning environment Learning environment
D6-43 D6-44	**Element 2.3 – Learning and Teaching Methods and Resources**	
D6-45	1. Standard Level 1 ➢ Aware of a range of learning methods that may be used in learning and teaching activities	T/L methods
D6-46	2. Standard Level 2 ➢ Applies learning and teaching methods that are relevant to programme content ➢ Uses learning resources appropriately	T/L methods Learning resources
D6-47	3. Standard Level 3 ➢ Adapts learning and teaching methods to unexpected circumstances ➢ Develops innovative learning resources	T/L methods Learning resources
D6-48	**Element 2.4 – Feedback on Learning** 1. Standard Level 1	

D6-49	➤ Understands the importance of seeking, receiving and responding to feedback about learning and teaching	Giving feedback
D6-50		
	2. Standard Level 2	
D6-51	➤ Develops self-awareness in learners	Self-awareness
D6-52	➤ Listens actively and provides effective feedback to learners using a range of methods	Giving feedback
	3. Standard Level 3	
D6-53	➤ Develops self-awareness in learners and teachers	Self-awareness
D6-54	➤ Interprets, synthesises and deals with conflicting information arising from feedback from learners and educators	Dealing with conflict
D6-55	➤ Effectively demonstrates to learners the rationale for changing or not changing teaching and learning activities in response to feedback	Rationale for change in T/L
	Element 2.5/2.6 – Participation and Reflection	
	1. Standard Level 1	
D6-56	➤ Describes ways of involving learners in actual practice e.g. experiential learning opportunities	Reflective practice
D6-57	➤ Aware of the importance of reflection on practice	Reflection on practice
	2. Standard Level 2	
D6-58	➤ Engages learners in reflective practice	Reflective practice
D6-59	➤ Uses systems of teaching and training that incorporate reflective practice in self and others	Reflective practice
	3. Standard Level 3	
D6-60	➤ Actively seeks to incorporate learners into a community of practice	Learning in community
D6-61	➤ Demonstrates a commitment to reflective practice in self, learners and colleagues	Reflective practice
	Domain 3: Assessment and feedback to learners **Element 3.1 – The Purpose of the Assessment**	
	1. Standard Level 1	
D6-62	➤ Aware of the general purpose of assessment	Assessment purpose
	2. Standard Level 2	
D6-63	➤ Relates the purposes of assessments to the context of the course or programme	Assessment in course/programme
	3. Standard Level 3	

D6-64	➢ Designs complex assessment strategies and blueprints	Assessment strategies
	Element 3.2 – The Content of the Assessment	
D6-65	1. Standard Level 1 ➢ Aware that assessment should align with the course learning outcomes	Assessment and learning outcomes
D6-66	2. Standard Level 2 ➢ Demonstrates that the contribution of any assessment addresses the learning outcomes and the assessment blueprint	Assessment and learning outcomes
D6-67	3. Standard Level 3 ➢ Maintains and manages assessment blueprints for one or more courses and/or levels	Assessment management
	Element 3.3 – The Development of the Assessment	
D6-68	1. Standard Level 1 ➢ Aware that good assessment practices are integral to course development	Good assessment practice
D6-69	2. Standard Level 2 ➢ Contributes to the construction of assessment items	Construct assessment
D6-70	3. Standard Level 3 ➢ Leads design and development of assessments utilising accepted good practice such as in the determination of reliability, validity, acceptability, cost effectiveness and educational impact	Develop assessment processes/tools
	Element 3.4 – Selecting Appropriate Assessment Methods	
D6-71	1. Standard Level 1 ➢ Aware that assessment methods are chosen on the basis of the purpose, content and level of the assessment	Assessment methods
D6-72	➢ Uses a basic range of methods to assess learners	Assessment methods
D6-73	2. Standard Level 2 ➢ Selects assessment methods that match the purpose, content and level of the learner	Assessment methods

D6-74	➢ Uses a broad range of methods to assess learners	Assessment methods
	3. Standard Level 3	
D6-75	➢ Assess learners using a wide range of methods	Assessment methods
	Element 3.5 – Maintaining the Quality of Assessment	
	1. Standard Level 1	
D6-76	➢ Aware that assessment practices require continuous monitoring and improvement	Assessment monitoring/improvement
	2. Standard Level 2	
D6-77	➢ Interprets accurately assessment reports in relation to educational quality management	Educational quality
	3. Standard Level 3	
D6-78	➢ Contributes under guidance to standard setting processes	Standard setting
D6-79	➢ Applies standard setting procedures most relevant to particular methods and format	Standard setting
D6-80	➢ Interprets technical data about effectiveness of assessment practices	Assessment evaluation
D6-81	➢ Prepares assessment reports for learners, examination boards and external stakeholders	Assessment evaluation
	Domain 4: Educational research and evidence-based practice	
	Element 4.1 – Theoretical and Evidence-Base of Medical Education	
	1. Standard Level 1	
D6-82	➢ Aware of basic educational theories and principles	Educational theories/principles
D6-83	➢ Aware of literature relevant to current developments in medical education	Medical education literature
D6-84	➢ Aware of the principles of critical appraisal	Critical appraisal
	2. Standard Level 2	
D6-85	➢ Understands and applies a range of educational theories and principles	Educational theories/principles
D6-86	➢ Critically evaluates the educational literature and applies this learning to their educational practice	Critical appraisal
D6-87	➢ Contributes to the design and development of educational research or projects	Design educational research
D6-88	➢ Interprets and applies the results of educational	Interpret/apply

	research to their educational practice	research
D6-89	➤ Aware of the major issues and challenges facing medical educational research	Research challenges
	3. Standard Level 3	
D6-90	➤ Advanced understanding of a wide range of educational theories and principles	Educational theories/principles
D6-91	➤ Critically evaluates the literature at an advanced level and applies this to their educational practice	Critical appraisal
D6-92	➤ Develops new educational insights, theories and practices through policy development and/or academic publication in relevant journals	Develop new educational research
D6-93	➤ Designs, supervises, manages and evaluates research strategies or projects	Research management
D6-94	➤ Contributes to educational research or projects applying appropriate research methods	Research contribution
D6-95	➤ Mentors and supports the professional development of educational researchers or educational project leads	Professional development in educational research
	Domain 5: Educational management and leadership	
	Element 5.1 – Educational Management	
	1. Standard Level 1	
D6-96	➤ Manages personal educational time and resources effectively	Time and resource management
D6-97	➤ Achieves intended educational outcomes by meeting the learning needs of individuals	Educational achievement
	2. Standard Level 2	
D6-98	➤ Manages educational programmes and resources, including individuals and/or financial resources at a local level	Programme and resource management
	3. Standard Level 3	
D6-99	➤ Manages educational programmes and resources, including individuals and/or financial resources beyond the local level	Programme and resource management
	Element 5.2 – Educational Leadership	
	1. Standard Level 1	
D6-100	➤ Understands role in local education	Local education
	2. Standard Level 2	
D6-	➤ Leads educational projects or programmes locally	Lead local

101 D6-102	➢ Supports the educational development of others within a local team, faculty or department	education Local educational development
	3. Standard Level 3	
D6-103	➢ Advanced ability to communicate, lead, develop, integrate and formulate a wide range of educational interventions and programmes	Educational development in wide range programmes
D6-104	➢ Impacts upon medical education beyond immediate geographical locus	Educational impact
D6-105	➢ Contributes to educational policy and development at a national level	National educational policy/development
D6-106	➢ Successfully discharges senior roles in medical education	Senior roles in medical education
	Element 5.3 – Educational Government	
	1. Standard Level 1	
D6-107	➢ Understands the roles of statutory and other regulatory bodies in the provision and quality assurance of medical education	Statutory/regulatory bodies, QA
	2. Standard Level 2	
D6-108	➢ Is involved in the provision and quality assurance of medical education	QA
	3. Standard Level 3	
D6-109	➢ Involved in the development of effective educational standards or governance frameworks	Educational standard/governance

Appendix B

The Delphi questionnaire

(Educator panel)

← **Back to My surveys**

Home   About Bristol Online Surveys   **Contact Us**

Creating a Curriculum - Delphi Round 1 (Educator)

The First Round Delphi Questionnaire

Section 1 Instructions on how to complete Delphi round 1

The first round of this Delphi study lists educational content relevant to health professional educators. The educational content from several international published journals and health professional education programmes, from several higher education institutes around the world, has been analysed in order to compile the following questionnaire. This first round questionnaire consists of four sections.

Section 1 - Here you will be provided with instructions on how to complete the questionnaire.

Section 2 - This is a consent form. You will be asked to enter your name to consent to participate in the study.

Section 3 - In this section you will be presented with educational content divided into 12 different themes. You will be asked to rate whether the educational content should be included in a curriculum for developing educators of dental undergraduate students in Europe.

The rating scale is as follows:

1 -- Not Necessary -- "The content is not important and does not need to be included in the curriculum"
2 -- Optional -- "The content depends on the context and/or the content should be set as an elective module"
3 -- Desirable -- "The content is useful and should be included in the curriculum"
4 -- Essential -- "The content is strongly required and needs to be included in the curriculum"

You will be asked to select one option for each item.

You can see more detail of the educational content by clicking on the "More Info" button on the top right of each theme.

At the end of each theme, you will be asked to provide your comments on the educational content. You can provide reasons to support your opinions or suggest the removal of irrelevant items, adjust ambiguous items, or add new items. You can also address any other issues you feel the questionnaire has not covered. All suggestions will be analysed in order to adjust and improve the quality of the second round Delphi questionnaire.

Section 4 - In the final section you will be asked to provide demographic information which relates to your role as "a teacher of undergraduate students".

The questionnaire will take approximately **20-30 minutes** to complete.

Data Protection

For the purposes of this survey Cardiff University is the data controller. All data collected in this survey will be held securely by the survey software provider (Bristol University) under contract and then retained by the School of Dentistry, Cardiff University in accordance with the Data Protection Act (1998). Data from the survey, including answers to questions where personal details are requested, will only be used by Mr.Supachai Chuenjitwongsa for reporting purposes.

Cookies (personal data stored by your Web browser) are not used in this survey.

Continue >

Top | Copyright | Contact Us

     10/06/2012 21:47

Supachai Chuenjitwongsa   Appendix B

← **Back to My surveys**

Home   **About Bristol Online Surveys**   **Contact Us**

Creating a Curriculum - Delphi Round 1 (Educator)

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Section 2 Consent Form

Consent Statement
I **am willing** to participate in all Delphi rounds (up to 3) of the study "Creating a curriculum for educators of dental undergraduate students in Europe."
I have read and understood the information about the process of the study.
I have had the opportunity to consider the information, ask questions and have had them answered satisfactorily.
I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. However, I understand that the success of this study depends on all participants completing all Delphi rounds.
I understand that I will remain anonymous to the other participants throughout this Delphi study and only the researcher (Mr.Supachai Chuenjitwongsa) will be able to identify my specific answers.
I understand that the researcher (Mr.Supachai Chuenjitwongsa) will hold all information and data collected in a secure and confidential manner.
I understand that after all data has been collected, only anonymised data will be kept and all documents, hard or electronic copies containing my personal data will be destroyed.
I understand that my contribution to this project will be acknowledged in any publications that may arise, unless I request continued anonymity.
1. By entering my name into the box provided below, I am consenting to take part in and am willing to complete the study.
For the full information of this study, please see the document entitled "Doc2-Information Sheet." (attached with the invitation email)

Continue >

Survey testing only
Check Answers & Continue >

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Home　　About Bristol Online Surveys　　Contact Us

Creating a Curriculum - Delphi Round 1 (Educator)

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Page 3 of 4

Section 3 Your Opinions on Educational Content

From the list below, which is arranged thematically, please indicate in the table below how important you think it is for each subtheme to be included in a curriculum for developing dental educators of undergraduate students in Europe.

2. Theme 1: Educational Theories and Principles　　　　[More Info]

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	2	3	4
a. Learning Theories	○	○	○	○
b. Learning Styles and Learning Approaches	○	○	○	○
c. Learning Environment	○	○	○	○
d. Reflective Practice	○	○	○	○
e. Mentoring and Coaching	○	○	○	○
f. Contemporary Teaching and Learning Methods	○	○	○	○
g. Educational Strategies and Processes	○	○	○	○

3. Theme 1: Educational Theories and Principles
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

4. Theme 2: Modes of Education　　　　[More Info]

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	2	3	4
a. Large Group Teaching	○	○	○	○
b. Small Group Teaching	○	○	○	○
c. One-to-One Teaching	○	○	○	○
d. Teaching in the Clinical Setting	○	○	○	○
e. Outreach/Community Based/Workplace-Based Teaching	○	○	○	○
f. Inter-/Multi-professional Teaching	○	○	○	○

5. Theme 2: Modes of Education
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

6. Theme 3: Learners' Issues　　　　[More Info]

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	2	3	4
a. Learners' Problems and Difficulties	○	○	○	○
b. Support for Learners	○	○	○	○
c. Learners with Special Needs	○	○	○	○

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7. Theme 3: Learner's Issues
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

8. Theme 4: Educational Materials and Instructional Design [More Info]

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
a. Learning Resources, Educational Media and Materials	○	○	○	○
b. Instructional Design	○	○	○	○

9. Theme 4: Educational Materials and Instructional Design
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

10. Theme 5: Assessment and Feedback [More Info]

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
a. Assessment Principles	○	○	○	○
b. Assessment Methods and Instruments	○	○	○	○
c. Performance Assessment	○	○	○	○
d. Self-Assessment	○	○	○	○
e. Feedback	○	○	○	○
f. Assessment Calibration	○	○	○	○

11. Theme 5: Assessment and Feedback
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

12. Theme 6: Curriculum [More Info]

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
a. Curriculum Development	○	○	○	○
b. Curriculum Implementation	○	○	○	○
c. Programme and Course Development	○	○	○	○

13. Theme 6: Curriculum
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

14. Theme 7: Evaluation [More Info]

Supachai Chuenjitwongsa   Appendix B

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	2	3	4
a. Evaluation of Educational Programmes	○	○	○	○
b. Teacher and Teaching Evaluation	○	○	○	○

15. Theme 7: Evaluation
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

16. Theme 8: Educational Research   More Info

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	2	3	4
a. Educational Research and Methods	○	○	○	○
b. Research Components and Processes	○	○	○	○

17. Theme 8: Educational Research
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

18. Theme 9: Educational Management   More Info

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	2	3	4
a. Educational System and Dental Education	○	○	○	○
b. Management and Organisation Principles in Dental Education	○	○	○	○
c. Leadership and Teamwork	○	○	○	○
d. Educational Change	○	○	○	○
e. Student Recruitment and Admission	○	○	○	○

19. Theme 9: Educational Management
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

20. Theme 10: Quality Assurance   More Info

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	2	3	4
a. Principles of Audit, Quality, Standards and QA	○	○	○	○
b. Local/National QA and Regulatory Bodies	○	○	○	○
c. QA Implementation and Development	○	○	○	○

21. Theme 10: Quality Assurance
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

Supachai Chuenjitwongsa   Appendix B

22. Theme 11: Patient Care and Health Care System [More Info]

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	2	3	4
a. Health Care System and Management	○	○	○	○
b. Health Care Quality and Standards	○	○	○	○

23. Theme 11: Patient Care and Health Care System
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

24. Theme 12: Professionalism [More Info]

	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	2	3	4
a. Professional Ethics and Behaviour	○	○	○	○
b. Professionalism Development	○	○	○	○
c. Personal and Professional Skills: Content Knowledge and Expertise	○	○	○	○
d. Personal and Professional Skills: Clinical and Technical Skills	○	○	○	○
e. Personal and Professional Skills: Evidence-Based Practice	○	○	○	○
f. Personal and Professional Skills: Evidence-Based Education	○	○	○	○
g. Personal and Professional Skills: Communication and Interpersonal Skills	○	○	○	○
h. Personal and Professional Skills: Personal Management Skills	○	○	○	○
i. Personal and Professional Skills: Career Skills	○	○	○	○
j. Personal and Professional Skills: Personal and Professional Development	○	○	○	○

25. Theme 12: Professionalism
Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.
(Optional)

Section 4 Demographic Information

Please provide information which relates to your role as a teacher of undergraduate students.

26. Gender

○ Male
○ Female

27. Age

○ Below 25
○ 26 - 35
○ 36 - 45
○ 46 - 55
○ 56 - 65

○ Over 65

28. In which country do you currently work?

29. Your teaching experience

○ Early Career Educator (less than 5 years as a teacher)
○ Experienced Educator (between 6 and 12 years as a teacher)
○ Mature Educator (more than 13 years as a teacher)

30. Is your academic position

○ Full-Time
○ Part-Time

31. How many sessions do you work per week? (1 session = ½ a day); 10 sessions = full-time

32. What proportion of your job is involved with teaching undergraduate students?

○ Less than 20 %
○ 20 - 40 %
○ 40 - 60 %
○ 60 - 80 %
○ More than 80 %

33. In what educational environments do you teach undergraduate students?
(select all that apply)

☐ Classroom-Based
☐ Laboratory-Based
☐ Clinical-Based
☐ Outreach / Workplace-Based
☐ Community-Based
☐ Other *(please specify)*:

This is the end of the questionnaire.

When you click the "continue" button, your completed questionnaire will be submitted.

Continue >

Survey testing only
Check Answers & Continue >

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Creating a Curriculum - Delphi Round 1 (Educator)

Page 4 of 4

Thank you for taking the time to complete this first round questionnaire.

If you have any queries about this survey or want more information, please contact:

Mr. Supachai Chuenjitwongsa (PhD student)
Room 210, School of Dentistry, Cardiff University
Cardiff, CF14 4XY, Wales, UK.
email: chuenjitwongsas@cardiff.ac.uk

Or either supervisor:
Prof. Richard G Oliver
email: oliver@cf.ac.uk

Prof. Alison D Bullock
email: bullockad@cf.ac.uk

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1 of 1   10/06/2012 21:50

Appendix C

The Delphi questionnaire

(Student panel)

The First Round Delphi Questionnaire

Creating a Curriculum

for

Educators of Dental Undergraduate Students in Europe

Section 1: Instructions

Research Topic

Creating a curriculum for educators of dental undergraduate students in Europe

The Questionnaire

This questionnaire consists of 3 sections.

Section 1 - The instructions on how to complete the questionnaire.

Section 2 - You will be presented with educational content divided into 12 different themes. You will be asked to rate whether the educational content should be included in a curriculum for developing educators of dental undergraduate students in Europe.

In other words, **"If dental educators need to attend a training programme to develop their educational knowledge and teaching skills in order to support student learning, how important is the educational content listed in this questionnaire?"**

At the end of each theme, you will be asked to provide your comments on the educational content. You can provide reasons to support your opinions, suggest the removal of irrelevant items, suggest adding new items or suggest ways of clarifying any items. You can also address any other issues you feel the questionnaire has not covered.

Section 3 - You will be asked to provide demographic information which relates to your role as "an undergraduate student".

The questionnaire will take **approximately 20-30 minutes** to complete.

Section 2: Your Opinions on Educational Content

How to Complete the Questionnaire

In each theme, please indicate how important you think it is for each subtheme to be included in a curriculum for developing dental educators of undergraduate students in Europe.

The rating scale is as follows:

1 = Not Necessary -- "The content is not important and does not need to be included in the curriculum"

2 = Optional -- "The content depends on the context and/or the content should be set as an elective module"

3 = Desirable -- "The content is useful and should be included in the curriculum"

4 = Essential -- "The content is strongly required and needs to be included in the curriculum"

Please select one option for each item by tick (✓) or cross (X) in the table provided.

Theme 1:   Educational Theories and Principles

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Learning Theories				
2. Learning Styles and Learning Approaches				
3. Learning Environment				
4. Reflective Practice				
5. Mentoring and Coaching				
6. Contemporary Teaching and Learning Methods				
7. Educational Strategies and Processes				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 2:   Modes of Education

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Large Group Teaching				
2. Small Group Teaching				
3. One-to-One Teaching				
4. Teaching in the Clinical Setting				
5. Outreach/Community Based/Workplace-Based Teaching				
6. Inter-/Multi-professional Teaching				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 3:   Learner's Issues

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Learner's Problems and Difficulties				
2. Support for Learners				
3. Learners with Special Needs				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 4:   Educational Materials and Instructional Design

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Learning Resources, Educational Media and Materials				
2. Instructional Design				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 5:   Assessment and Feedback

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Assessment Principles				
2. Assessment Methods and Instruments				
3. Performance Assessment				
4. Self-Assessment				
5. Feedback				
6. Assessment Calibration				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 6:   Curriculum

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Curriculum Development				
2. Curriculum Implementation				
3. Programme and Course Development				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 7:   Evaluation

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Evaluation of Educational Programmes				
2. Teacher and Teaching Evaluation				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 8:   Educational Research

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Educational Research and Methods				
2. Research Components and Processes				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 9:   Educational Management

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Educational System and Dental Education				
2. Management and Organisation Principles in Dental Education				
3. Leadership and Teamwork				
4. Educational Change				
5. Student Recruitment and Admission				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 10: Quality Assurance

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Principles of Audit, Quality, Standards and QA				
2. Local/National QA and Regulatory Bodies				
3. QA Implementation and Development				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 11: Patient Care and Health Care System

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Health Care System and Management				
2. Health Care Quality and Standards				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Theme 12: Professionalism

Subtheme	Educational Content (1 = Not Necessary, 2 = Optional, 3 = Desirable, 4 = Essential)			
	1	**2**	**3**	**4**
1. Professional Ethics and Behaviour				
2. Professionalism Development				
3. Content Knowledge and Expertise				
4. Clinical and Technical Skills				
5. Evidence-Based Practice				
6. Evidence-Based Education				
7. Communication and Interpersonal Skills				
8. Personal Management Skills				
9. Career Skills				
10. Personal and Professional Development				

Please provide reasons to support your opinions or provide suggestions for removing/adjusting/adding any educational content in the space below.

Section 3: Demographic Information

Please provide information which relates to your role as an undergraduate student by tick (✓) in the box (□) provided.

1. Gender   □   Male   □   Female

2. Age   □   Below 20

          □   21 – 30

          □   Over 30

3. In which country do you currently study? [   ]

4. Year of Study

□   First Year   □   Second Year   □   Third Year

□   Fourth Year   □   Fifth Year   □   Other: _____

5. What educational environments have you experienced to date? (select all that apply)

□   Classroom-Based   □   Laboratory-Based

□   Clinical-Based   □   Outreach/Community/Workplace-Based

□   Other: _____ (please specify)

6. Your email address (for sending you the result of the study and/or the second round questionnaire[if required])

[   ]

If you have any queries about this questionnaire or want more information,

please contact:

Mr. Supachai Chuenjitwongsa (PhD student)

Room 210, School of Dentistry, Cardiff University

Cardiff, CF14 4XY, Wales, UK.

email: chuenjitwongsas@cardiff.ac.uk

Or either supervisor:

Prof. Richard G Oliver   email: oliver@cf.ac.uk

Prof. Alison D Bullock   email: bullockad@cf.ac.uk

Thank you for taking the time to complete this first round questionnaire

Appendix D

Details of the 'More Info' button

Theme 1:   Educational Theories and Principles

Subtheme: Learning Theories

➢ General principles of education and learning theories (e.g. behaviourism, cognitivism, constructivism, humanism)

➢ Human brain, development, and learning (cognitive, psychomotor and affective domains) and implications in education (e.g. Bloom's taxonomy)

➢ How adults learn

➢ Teacher-centred learning

➢ Student-centred learning

➢ Patient-centred learning

➢ Experiential learning

➢ Self-directed learning (SDL)

➢ Application of educational theories/evidence

Subtheme: Learning Styles and Learning Approaches

➢ Learning styles

➢ Learning approaches (e.g. surface and deep learning)

Subtheme: Learning Environment

➢ Learning environment in a curriculum (e.g. teaching and learning environment, clinical environment)

➢ Learning environment outside a curriculum (e.g. extracurricular activities)

Subtheme: Reflective Practice

- ➤ Principles of reflection
- ➤ Reflection on practice
- ➤ Reflection in practice

Subtheme: Mentoring and Coaching

- ➤ Mentoring
- ➤ Coaching
- ➤ Counselling

Subtheme: Contemporary Teaching and Learning Methods

- ➤ Outcome-based and competency-based education
- ➤ Problem-based learning (PBL)
- ➤ Case-based learning (CBL)
- ➤ Active learning
- ➤ Co-operative learning
- ➤ Opportunistic learning
- ➤ Learning contract
- ➤ Blended-learning
- ➤ Portfolio as an educational tool

Subtheme: Educational Strategies and Processes

- ➤ How to select, develop, deliver and modify teaching strategies
- ➤ How to develop effective teaching
- ➤ How to create safe learning environment
- ➤ Learning needs assessment and analysis
- ➤ Identifying, selecting and sequencing content
- ➤ Ensuring learners understand the course and its components

➢ Facilitating learning (e.g. encouraging and motivating learning, engaging learners, dealing with conflict)

Theme 2: Modes of Education

Subtheme: Large Group Teaching

➢ Large group teaching techniques
➢ Preparing and delivering a lecture

Subtheme: Small Group Teaching

➢ Types of group and small group methods
➢ Small group dynamic
➢ Facilitating the group
➢ Intervention in dysfunctional groups
➢ Peer-assisted learning and tutorial groups

Subtheme: One-to-One Teaching

➢ Supervision
➢ One-to-one educational support and guidance
➢ Chairside teaching

Subtheme: Teaching in the Clinical Setting

➢ Integration of knowledge and practice
➢ Clinical/Procedural skills teaching
➢ Technical problems and errors in clinical education
➢ Role models in clinic

- ➤ Simulated patients
- ➤ Patient involvement in education

Subtheme: Outreach/Community Based/Workplace-Based Teaching

- ➤ Dental outreach teaching (i.e. teaching which takes place in community clinics or other sites outside of the university hospital but co-ordinated by a traditional provider of dental education such as a dental school)
- ➤ Teaching and learning in the workplace
- ➤ Supervision in the workplace
- ➤ Role models in the workplace

Subtheme: Inter-/Multi-professional Teaching

- ➤ Inter-professional education (i.e. occasions when students from two or more professions in health and social care learn together during all or part of their professional training with the objective of cultivating collaborative practice for providing client- or patient-centred health care)

Theme 3: Learner's Issues

Subtheme: Learners' Problems and Difficulties

- ➤ The type of learner problems and learning difficulties
- ➤ Dysfunctional behaviours
- ➤ Identifying and managing student's problems

Subtheme: Support for Learners

➢ Supporting learner's development

➢ Supporting the failing student (i.e. remediation)

Subtheme: Learners with Special Needs

➢ Types of learners with special needs

➢ Educational support for learners with special needs

Theme 4:   Educational Materials and Instructional Design

Subtheme: Learning Resources, Educational Media and Materials

➢ Preparing and using educational/instruction/learning materials

➢ Using information, learning resources and educational media for teaching and learning (e.g. clinical simulator, virtual learning environment)

Subtheme: Instructional Design

➢ Principles of Instructional Design

➢ Distance learning

➢ Technology enhanced learning

Theme 5:   Assessment and Feedback

Subtheme: Assessment Principles

- General principles of assessment (e.g. assessment purposes, Miller's pyramid)
- Assessing student progress (e.g. formative and summative assessment
- Learner profiles
- Assessment as a tool for teaching development
- Good assessment practice

Subtheme: Assessment Methods and Instruments

- Type, designing and developing assessment instruments
- Psychometric methods (e.g. validity, reliability)
- Standard setting, marking techniques and use of criteria
- Portfolio as an assessment instrument

Subtheme: Performance Assessment

- Outcome-based/Competency-based assessment
- Performance assessment
- Work-based assessment

Subtheme: Self-Assessment

- Self-monitoring
- Self-assessment

Subtheme: Feedback

- ➤ Assessment and feedback
- ➤ Giving constructive feedback

Subtheme: Assessment Calibration

- ➤ Calibration of instructors
- ➤ Calibration of assessment

Theme 6: Curriculum

Subtheme: Curriculum Development

- ➤ Curriculum philosophy, goals and structure (e.g. product, process, research)
- ➤ Problem identification and needs assessment
- ➤ Curriculum design, planning and organising
- ➤ Subtheme: Curriculum Implementation
- ➤ Support, resources and barriers for curriculum implementation
- ➤ Introducing and administering a curriculum
- ➤ Updating and reviewing a curriculum

Subtheme: Programme and Course Development

- ➤ Programme/Course design, planning and organising
- ➤ Managing an educational programme/course

Theme 7:   Evaluation

Subtheme: Evaluation of Educational Programmes

➢ General principles of educational programme evaluation

➢ Evaluation of educational components (e.g. teaching and learning, assessment, resource material, course, programme, curriculum)

➢ Learners' participation in audit and evaluation

Subtheme: Teacher and Teaching Evaluation

➢ Peer reviews of teaching

➢ Teacher evaluation and support

➢ Evaluation tools to support educators

Theme 8:   Educational Research

➢ Subtheme: Educational Research and Methods

➢ General principles of educational research

➢ Qualitative and quantitative methods

Subtheme: Research Components and Processes

➢ Research components (e.g. environment, ethics, funding)

➢ Research processes (e.g. developing, designing, implementing, interpreting, publishing)

➢ Evaluating educational research

Theme 9:   Educational Management

Subtheme: Educational System and Dental Education

- ➢ Overview of national educational system
- ➢ Development of European higher education: the Bologna Process and the European Higher Education Area (EHEA)
- ➢ Educational outcomes and characteristics of graduates of the 3 cycles of European higher education (Bachelor, Master, and Doctoral Level)
- ➢ History and development of dental education and other health professional education
- ➢ Local/National/International dental education context, policies, organisations, and discussion groups

Subtheme: Management and Organisation Principles in Dental Education

- ➢ General principles of management (e.g. mission-based management, strategic management, marketing, effective management)
- ➢ General principles of organisation (e.g. vision, goals, missions, functions, environment, politics)
- ➢ Structure and roles of a dental school
- ➢ Managing educational programmes
- ➢ Educational resource management (e.g. budget and financial, facilities)
- ➢ Human resource management (e.g. staff development and training)
- ➢ Management of cultural diversity (e.g. equality, diversity, opportunity)

Subtheme: Leadership and Teamwork

- Leadership
- Team building and teamwork

Subtheme: Educational Change

- Development and implementation of organisational change
- Change and development of dental education

Subtheme: Educational System and Dental Education

- Recruitment and selection processes

Theme 10:   Quality Assurance

Subtheme: Principles of Audit, Quality, Standards and QA

- Terminology which relates to quality matters
- Principles of audit, educational quality and standards

Subtheme: Local/National QA and Regulatory Bodies

- Local/National/International QA
- Educational standards/governance
- Statutory/regulatory bodies

Subtheme: QA Implementation and Development

- Developing and implementing QA system for dental education

Theme 11:   Patient Care and Health Care System

Subtheme: Health Care System and Management

- ➢ Health care system and function
- ➢ Evidence-based oral health care and practice
- ➢ Sensitivity to local health needs
- ➢ Cultural perspectives in medicine/health and barriers to health care
- ➢ Financing health care
- ➢ Poor patient care and improvement

Subtheme: Health Care Quality and Standards

- ➢ Health care and service quality
- ➢ Clinical standards, protocols, policy and governance
- ➢ Local/National standards and guidance

Theme 12:   Professionalism

Subtheme: Professional Ethics and Behaviour

- ➢ Ethics and professionalism in educational roles
- ➢ Professional ethics, conduct, behaviour and standards
- ➢ Training regulations and current educational and professional requirements
- ➢ Characteristics of dental educators (e.g. positive attitude toward educational role, Enthusiasm for teaching, role model)

Subtheme: Professionalism Development

➢ Developing professionalism in dental education
➢ Commitment and advocate to dental education

Subtheme: Content Knowledge and Expertise

➢ Knowledge and skills of discipline

Subtheme: Clinical and Technical Skills

➢ Clinical examination skills
➢ Clinical and technical skills

Subtheme: Evidence-Based Practice

➢ Evidence-based medicine and dentistry
➢ Evidence-based skills (e.g. critical appraisal, application of evidence)
➢ Subtheme: Evidence-Based Education
➢ Using evidence to support and develop education

Subtheme: Communication and Interpersonal Skills

➢ Communication and presentation skills
➢ Working with different people
➢ Response to evaluation/criticism
➢ Problem solving and creative thinking
➢ Conflict resolving and negotiation
➢ Subtheme: Personal Management Skills
➢ Time and task management
➢ Organising of meeting

Subtheme: Career Skills

➢ Career planning and development

➢ Balance roles and workload

Subtheme: Personal and Professional Development

➢ Updating teaching and learning techniques

➢ Developing personal and professional skills

➢ Agencies and sources of information for personal and professional development

Appendix E

The supplementary questionnaire

(Student panel)

The Supplementary Questionnaire

Creating a Curriculum for

Educators of Dental Undergraduate Students in Europe

"Student opinions on the result of the first round Delphi"

Brief Information and Instructions

Research Topic

Creating a curriculum for educators of dental undergraduate students in Europe

Purpose

The purpose of this research project is to develop a curriculum to support European dental educators of undergraduate students, in other words a 'teaching the teachers' programme. This research was carried out using the Delphi technique (questionnaire) at the EDSA meeting 2012 at Lyon, France.

The result of the first round Delphi is presented on pages 4 – 5. There are several issues which still need to be explored to help to explain the results.

Information about the Researcher and project

Researcher: Mr. Supachai Chuenjitwongsa (BPA, DDS, MSc, FHEA). I am a PhD student at the School of Dentistry, Cardiff University, UK.

Supervisors: Prof. Richard G Oliver (School of Dentistry, Cardiff University) and Prof. Alison D Bullock (School of Social Sciences, Cardiff University)

This study has been approved by the Dental School Research Ethics Committee, Cardiff University on 23rd January 2012.

Invitation

You are invited to participate in this study. As a student, you are a vital part of the dental education process. Your help and opinions are very important for the future development of dental education in Europe.

Consent

Please read the following statement:

By providing my printed name and signature in the space below, I am willing to participate in the study. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. I understand that I will remain anonymous to the other participants throughout this study and only anonymised data will be kept. I understand that my contribution to this project will be acknowledged in any publications that may arise.

_____ _____ _____

Name (Print)　　　　　　　Date　　　　　　　Signature

The Result of the First Round Delphi (Student Panel)

"If dental educators need to attend a training programme to develop their educational knowledge and teaching skills in order to support student learning, how important is the educational content listed in the questionnaire?"

Educational content which it has been agreed **needs to be included** in a curriculum for educators

1. Learning Styles and Learning Approaches
2. Reflective Practice
3. Mentoring and Coaching
4. Contemporary Teaching and Learning Methods
5. Small Group Teaching
6. Teaching in the Clinical Setting
7. Outreach/Community Based/Workplace-Based Teaching
8. Inter-/Multi-professional Teaching
9. Support for Learners
10. Learning Resources, Educational Media and Materials
11. Assessment Methods and Instruments
12. Performance Assessment
13. Self-Assessment
14. Learning Styles and Learning Approaches
15. Reflective Practice
16. Mentoring and Coaching
17. Contemporary Teaching and Learning Methods
18. Small Group Teaching
19. Teaching in the Clinical Setting
20. Outreach/Community Based/Workplace-Based Teaching
21. Inter-/Multi-professional Teaching
22. Support for Learners
23. Learning Resources, Educational Media and Materials
24. Assessment Methods and Instruments
25. Performance Assessment
26. Self-Assessment
27. Feedback
28. Curriculum Development
29. Curriculum Implementation
30. Programme and Course Development
31. Evaluation of Educational Programmes
32. Teacher and Teaching Evaluation
33. Educational Research and Methods
34. Educational System and Dental Education
35. Management and Organisation Principles in Dental Education
36. Leadership and Teamwork
37. Local/National QA and Regulatory Bodies
38. Health Care System and Management
39. Health Care Quality and Standards
40. Professional Ethics and Behaviour
41. Professionalism Development
42. Content Knowledge and Expertise
43. Clinical and Technical Skills
44. Evidence-Based Practice
45. Evidence-Based Education
46. Communication and Interpersonal Skills
47. Personal Management Skills
48. Personal and Professional Development

Supachai Chuenjitwongsa   Appendix E

Educational content which **has not yet achieved consensus**

1. Learning Theories	9. Assessment Calibration
2. Learning Environment	10. Research Components and Processes
3. Educational Strategies and Processes	11. Educational Change
4. One-to-One Teaching	12. Student Recruitment and Admission
5. Learner's Problems and Difficulties	13. Principles of Audit, Quality, Standards and QA
6. Learners with Special Needs	14. QA Implementation and Development
7. Instructional Design	15. Career Skills
8. Assessment Principles	

Educational content which it has been agreed does **not need to be included** in a curriculum for educators

1. Large Group Teaching

Instructions for Completing the Questionnaire

This questionnaire consists of 2 sections.

Section 1 - You will be presented with 3 questions related to the result of the first round Delphi presented on pages 4 – 5. You will be asked to provide your comments on the educational content. You can also comment on any other issues you feel the questionnaire has not covered.

Section 2 - You will be asked to provide demographic information which relates to your role as "an undergraduate student".

The questionnaire will take **approximately 10-15 minutes** to complete.

If you have any queries about this questionnaire or want more information, please contact:

Mr. Supachai Chuenjitwongsa (PhD student)

Room DA2, The Dental Annexe, School of Dentistry

College of Biomedical and Life Sciences, Cardiff University

Cardiff, CF14 4XY, Wales, UK.

Email: chuenjitwongsas@cardiff.ac.uk

Or either supervisor:

Prof. Richard G Oliver   email: oliver@cf.ac.uk

Prof. Alison D Bullock   email: bullockad@cf.ac.uk

Section 1: Your Opinions on Educational Content

Question 1

According to the "content which should be included in the curriculum" (from page 4), Do you agree that all these are important?

☐ Yes ☐ No

If not, please list the item(s) which are not important and provide your opinion in the box below.

Item(s) which are not important	Your Opinion

Question 2

According to the "Educational content which **has not yet achieved the consensus**" (top of page 5), which do you think are important or are not important for educators in order to provide high quality education and be able to support student learning? Please tick (✓) in the box and provide your opinion in the space.

Item	Important	Not Important	Your Opinions
1. Learning Theories			
2. Learning Environment			
3. Educational Strategies and Processes			
4. One-to-One Teaching			
5. Learner's Problems and Difficulties			
6. Learners with Special Needs			
7. Instructional Design			
8. Assessment Principles			
9. Assessment Calibration			

Item	Important	Not Important	Your Opinions
10. Research Components and Processes			
11. Educational Change			
12. Student Recruitment and Admission			
13. Principles of Audit, Quality, Standards and QA			
14. QA Implementation and Development			
15. Career Skills			

Question 3

According to the "Educational content which educators **does not need to be included** in the curriculum", do you agree with the result that educators do not need to learn about "how to teach in large-group" or "how to lecture"? Please provide your opinion.

Section 2: Demographic Information

Please provide information which relates to your role as an undergraduate student by tick (✓) in the box (□) provided.

1. Gender	□	Male		□	Female	

2. Age   □   Below 20

□   21 – 30

□   Over 30

3. In which country do you currently study? [_____]

4. Year of Study

□   First Year   □   Second Year   □   Third Year

□   Fourth Year   □   Fifth Year   □   Other: _____

5. What educational environments have you experienced to date? (select all that apply)

□   Classroom-Based   □   Laboratory-Based

□   Clinical-Based   □   Outreach/Community/Workplace-Based

□   Other: _____ (please specify)

6. Your email address (for sending you the result of the study) – optional

[_____]

Thank you for taking the time to complete this questionnaire

Appendix F

The verification questionnaire

(Educator panel)

Agreeing a Curriculum for

Educators of Dental Undergraduate Students in Europe

Research Topic

Agreeing the content of a curriculum for educators of dental undergraduate students in Europe

Purpose

The purpose of this research project is to agree the content of a curriculum to support educators of European dental undergraduate students, in other words a 'teaching the teachers' programme. This research was carried out using the Delphi technique (questionnaire) asking opinion from educators across Europe. The final stage of this research is to verify the result (curriculum content).

Invitation

You are invited to participate in the process of verifying the curriculum content for educators of undergraduate students. Your opinion (collected via questionnaire) is an important part of the research process and will help to inform the future development of dental education in Europe.

Instruction

Before the questionnaire you will be presented with curriculum content for educators (see page 2). The questionnaire comprises 3 questions related to the curriculum content. You will be asked to provide your comments on the educational content. You can also comment on any other issues you feel the questionnaire has not covered.

Finally you will be asked to provide demographic information which relates to your role as a dental educator.

The questionnaire will take **approximately 5 – 10 minutes** to complete.

"By completing this questionnaire you are indicating your consent to participate in this research"

For more information, please contact:

Mr. Supachai Chuenjitwongsa (PhD student)   email: chuenjitwongsas@cardiff.ac.uk

Prof. Richard G Oliver (Supervisor)   email: oliver@cf.ac.uk

Prof. Alison D Bullock (Supervisor)   email: bullockad@cf.ac.uk

Section 1: Curriculum content for educators of undergraduate dental students in Europe

Domain	Topic	Core Content	Optional Content
Teaching and Learning	Educational Theories and Principles	➢ Learning Theories ➢ Learning Styles and Learning Approaches ➢ Learning Environment ➢ Reflective Practice ➢ Mentoring and Coaching ➢ Contemporary Teaching and Learning Methods ➢ Educational Strategies and Processes	
	Modes of Education	➢ Small Group Teaching ➢ One-to-One Teaching ➢ Teaching in the Clinical Setting	➢ Large Group Teaching ➢ Outreach/Community Based/Workplace-Based Teaching ➢ Inter-/Multi-professional Teaching
	Learner's Issues	➢ Learner's Problems and Difficulties ➢ Support for Learners	➢ Learners with Special Needs ➢ Career Guidance Skills
	Educational Materials	➢ Learning Resources, Educational Media and Materials ➢ Instructional Design	
	Assessment and Feedback	➢ Assessment Principles ➢ Assessment Methods and Instruments ➢ Performance Assessment ➢ Self-Assessment ➢ Feedback ➢ Assessment Calibration	
	Professionalism	➢ Professional Ethics and Behaviour ➢ Professionalism Development ➢ Content Knowledge and Expertise ➢ Clinical and Technical Skills ➢ Communication and Interpersonal Skills ➢ Personal Management Skills ➢ Personal and Professional Development	
Research	Educational Research	➢ Evidence-Based Education	➢ Educational Research and Methods ➢ Research Components and Processes
Administration	Curriculum	➢ Curriculum Development ➢ Curriculum Implementation ➢ Programme and Course Development	
	Evaluation	➢ Evaluation of Educational Programmes ➢ Teacher and Teaching Evaluation	
	Educational Management	➢ Leadership and Teamwork	➢ Educational System and Dental Education ➢ Management and Organisation Principles in Dental Education ➢ Educational Change ➢ Student Recruitment and Admission
	Quality Assurance	➢ Principles of Audit, Quality, Standards and QA ➢ QA Implementation and Development	➢ Local/National QA and Regulatory Bodies
Healthcare	Patient Care and Health Care System	➢ Evidence-Based Clinical Practice ➢ Health Care Quality and Standards	➢ Health Care System and Management

Section 2: Your opinions on educational content

Question 1

Do you agree that all these items in the "core content" are important?

☐ Yes   ☐ No

Please comment.

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Question 2

According to the **"optional content"**, do you agree that all these items are **not** core items to be included in a curriculum for educators?

☐ Yes   ☐ No

Please comments.

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Question 3

Which factors/issues need to be considered when tailoring a curriculum for educators in your context/organisation/country? Please provide your opinion in the box below.

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Section 3: Demographic Information

Please provide information which relates to your role as a dental educator by placing a tick (✓) in the box (□) provided.

1. Gender □ Male □ Female

2. Age □ Under 26 □ 26 – 35

   □ 36 – 45 □ 46 – 55

   □ 56 – 65 □ Over 65

3. In which European country do you currently work?

4. Teaching experience (Years) □ Up to 5

   □ Between 6 and 12 □ 13 and over □ N/A

5. Academic Position □ Full-Time □ Part-Time

   □ N/A

6. Proportion of the job which involves with teaching undergraduate students

   □ Up to 20 % □ 21 – 40 % □ 41 – 60 %

   □ 61 – 80 % □ More than 80 % □ N/A

7. What educational environments have you have involved or experienced? (select all that apply)

   □ Classroom-Based □ Laboratory-Based

   □ Clinical-Based □ Outreach/Community/Workplace-Based

   □ Other: _____ (please specify)

Thank you for taking the time to complete this questionnaire

Appendix G

The verification questionnaire

(Student panel)

Agreeing a Curriculum for

Educators of Dental Undergraduate Students in Europe

Research Topic

Agreeing the content of a curriculum for educators of dental undergraduate students in Europe

Purpose

The purpose of this research project is to agree the content of a curriculum to support educators of European dental undergraduate students, in other words a 'teaching the teachers' programme. This research was carried out using the Delphi technique (questionnaire) asking opinion from educators across Europe. The final stage of this research is to verify the result (curriculum content).

Invitation

You are invited to participate in the process of verifying the curriculum content for educators of undergraduate students. Your opinion (collected via questionnaire) is an important part of the research process and will help to inform the future development of dental education in Europe.

Instruction

Before the questionnaire you will be presented with curriculum content for educators (see page 2). The questionnaire comprises 3 questions related to the curriculum content. You will be asked to provide your comments on the educational content. You can also comment on any other issues you feel the questionnaire has not covered.

Finally you will be asked to provide demographic information which relates to your role as a dental educator.

The questionnaire will take **approximately 5 – 10 minutes** to complete.

"By completing this questionnaire you are indicating your consent to participate in this research"

For more information, please contact:

Mr. Supachai Chuenjitwongsa (PhD student)   email: chuenjitwongsas@cardiff.ac.uk

Prof. Richard G Oliver (Supervisor)   email: oliver@cf.ac.uk

Prof. Alison D Bullock (Supervisor)   email: bullockad@cf.ac.uk

Section 1: Curriculum content for educators of undergraduate dental students in Europe

Domain	Topic	Core Content	Optional Content
Teaching and Learning	Educational Theories and Principles	➢ Learning Theories ➢ Learning Styles and Learning Approaches ➢ Learning Environment ➢ Reflective Practice ➢ Mentoring and Coaching ➢ Contemporary Teaching and Learning Methods ➢ Educational Strategies and Processes	
	Modes of Education	➢ Small Group Teaching ➢ One-to-One Teaching ➢ Teaching in the Clinical Setting	➢ Large Group Teaching ➢ Outreach/Community Based/Workplace-Based Teaching ➢ Inter-/Multi-professional Teaching
	Learner's Issues	➢ Learner's Problems and Difficulties ➢ Support for Learners	➢ Learners with Special Needs ➢ Career Guidance Skills
	Educational Materials	➢ Learning Resources, Educational Media and Materials ➢ Instructional Design	
	Assessment and Feedback	➢ Assessment Principles ➢ Assessment Methods and Instruments ➢ Performance Assessment ➢ Self-Assessment ➢ Feedback ➢ Assessment Calibration	
	Professionalism	➢ Professional Ethics and Behaviour ➢ Professionalism Development ➢ Content Knowledge and Expertise ➢ Clinical and Technical Skills ➢ Communication and Interpersonal Skills ➢ Personal Management Skills ➢ Personal and Professional Development	
Research	Educational Research	➢ Evidence-Based Education	➢ Educational Research and Methods ➢ Research Components and Processes
Administration	Curriculum	➢ Curriculum Development ➢ Curriculum Implementation ➢ Programme and Course Development	
	Evaluation	➢ Evaluation of Educational Programmes ➢ Teacher and Teaching Evaluation	
	Educational Management	➢ Leadership and Teamwork	➢ Educational System and Dental Education ➢ Management and Organisation Principles in Dental Education ➢ Educational Change ➢ Student Recruitment and Admission
	Quality Assurance	➢ Principles of Audit, Quality, Standards and QA ➢ QA Implementation and Development	➢ Local/National QA and Regulatory Bodies
Healthcare	Patient Care and Health Care System	➢ Evidence-Based Clinical Practice ➢ Health Care Quality and Standards	➢ Health Care System and Management

Section 2: Your opinions on educational content

Question 1

Do you agree that all these items in the "core content" are important?

☐   Yes   ☐   No

Please comment.

```



```

Question 2

According to the **"optional content"**, do you agree that all these items are **not** core items to be included in a curriculum for educators?

☐   Yes   ☐   No

Please comments.

```



```

Question 3

Which factors/issues need to be considered when tailoring a curriculum for educators in your context/organisation/country? Please provide your opinion in the box below.

```



```

Section 3: Demographic Information

Please provide information which relates to your role as a dental educator by placing a tick (✓) in the box (□) provided.

1. Gender   □   Male   □   Female

2. Age   □   Under 20   □   20 – 30

                   □   N/A

3. In which European country do you currently study? [   ]

4. Year of Study

□   First Year   □   Second Year   □   Third Year

□   Fourth Year   □   Fifth Year   □   Other: _____

5. What educational environments have you experienced to date? (select all that apply)

□   Classroom-Based   □   Laboratory-Based

□   Clinical-Based   □   Outreach/Community/Workplace-Based

□   Other: _____ (please specify)

Thank you for taking the time to complete this questionnaire

Appendix H

The final results

(Educator panel)

Final Results of the Delphi Study (Educator Panel)

Research Topic

Agreeing Curriculum Content for Developing Dental Educators in Europe

Consensus Criteria

1. Consensus Item (to be included in a curriculum) – an item which fulfils **all three criteria:**

   ➤ At least 70% of participants rated 3 or 4 on that item and
   ➤ Mean ≥ 3.2 and
   ➤ SD ≤ 1.0

2. Non-Consensus Item – an item which falls in **either category:**

   (a) 30 – 69% of participants rated 3 or 4 on that item

   or

   (b) At least 70% of participants rate 3 or 4 on that item **but**

   ➤ Mean < 3.2 or
   ➤ SD > 1.0

Note: In the next section, items highlighted in yellow indicate the category into which each non-consensus item falls)

3. Consensus Item (**not** to be included in a curriculum) – an item which achieves this following criterion:

   ➤ Less than 30% of participants rated 3 or 4 on that item

Supachai Chuenjitwongsa   Appendix H

Numbers of Consensus and Non-Consensus Items

Curriculum Topic	Total Items	Consensus (Inclusion)	Non-consensus	Consensus (Exclusion)
1. Educational Theories and Principles	7	7	0	0
2. Modes of Education	6	3	3	0
3. Learner's Issues	3	2	1	0
4. Educational Materials and Instructional Design	2	2	0	0
5. Assessment and Feedback	6	6	0	0
6. Curriculum	3	3	0	0
7. Evaluation	2	2	0	0
8. Educational Research	2	0	2	0
9. Educational Management	5	1	4	0
10. Quality Assurance	3	2	1	0
11. Patient Care and Health Care System	2	1	1	0
12. Professionalism	10	9	1	0
Total	**51**	**38**	**13**	**0**

Details of Each Curriculum Topic

Curriculum Topic 1:   Educational Theories and Principles

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Learning Theories	91	3.4	0.7	3	4	6	Consensus
2. Learning Styles and Learning Approaches	96	3.6	0.6	4	4	3	Consensus
3. Learning Environment	94	3.3	0.6	3	3	4	Consensus
4. Reflective Practice	100	3.7	0.5	4	4	1	Consensus
5. Mentoring and Coaching	98	3.6	0.5	4	4	2	Consensus
6. Contemporary Teaching and Learning Methods	91	3.5	0.7	4	4	6	Consensus
7. Educational Strategies and Processes	92	3.5	0.6	4	4	5	Consensus

Curriculum Topic 2:   Modes of Education

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Large Group Teaching	64	2.7	0.8	3	3	5	Non-consensus
2. Small Group Teaching	98	3.7	0.6	4	4	1	Consensus
3. One-to-One Teaching	79	3.3	0.9	4	4	4	Consensus
4. Teaching in the Clinical Setting	98	3.8	0.4	4	4	1	Consensus
5. Outreach/ Community Based/ Workplace-Based Teaching	81	3.0	0.6	3	3	3	Non-consensus
6. Inter-/Multi-professional Teaching	89	3.1	0.6	3	3	2	Non-consensus

Curriculum Topic 3:   Learner's Issues

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Learner's Problems and Difficulties	92	3.5	0.6	4	4	1	Consensus
2. Support for Learners	92	3.4	0.6	3	4	1	Consensus
3. Learners with Special Needs	64	2.7	0.7	3	3	2	Non-consensus

Curriculum Topic 4:   Educational Materials and Instructional Design

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Learning Resources, Educational Media and Materials	94	3.6	0.6	4	4	1	Consensus
2. Instructional Design	91	3.3	0.7	3	3	2	Consensus

Curriculum Topic 5:   Assessment and Feedback

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Assessment Principles	91	3.6	0.7	4	4	4	Consensus
2. Assessment Methods and Instruments	94	3.6	0.6	4	4	3	Consensus
3. Performance Assessment	98	3.7	0.5	4	4	2	Consensus
4. Self-Assessment	98	3.6	0.5	4	4	2	Consensus
5. Feedback	98	3.8	0.4	4	4	2	Consensus
6. Assessment Calibration	100	3.6	0.5	4	4	1	Consensus

Curriculum Topic 6:   Curriculum

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Curriculum Development	83	3.3	0.8	3	4	3	Consensus
2. Curriculum Implementation	87	3.2	0.7	3	3	2	Consensus
3. Programme and Course Development	96	3.6	0.6	4	4	1	Consensus

Curriculum Topic 7:   Evaluation

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Evaluation of Educational Programmes	88	3.6	0.7	4	4	2	Consensus
2. Teacher and Teaching Evaluation	92	3.6	0.6	4	4	1	Consensus

Curriculum Topic 8:   Educational Research

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Educational Research and Methods	82	3.1	0.8	3	3	1	Non-consensus
2. Research Components and Processes	72	3.0	0.8	3	3	2	Non-consensus

Curriculum Topic 9:   Educational Management

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Educational System and Dental Education	74	3.0	0.7	3	3	3	Non-consensus
2. Management and Organisation Principles in Dental Educations	64	2.8	0.8	3	3	5	Non-consensus
3. Leadership and Teamwork	87	3.3	0.8	3	3	1	Consensus
4. Educational Change	76	3.0	0.8	3	3	2	Non-consensus
5. Student Recruitment and Admission	67	2.9	0.9	3	3	4	Non-consensus

Curriculum Topic 10:   Quality Assurance

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Principles of Audit, Quality, Standards and QA	77	3.2	0.8	3	4	2	Consensus
2. Local/National QA and Regulatory Bodies	79	3.0	0.8	3	3	1	Non-consensus
3. QA Implementation and Development	75	3.2	0.8	3	4	3	Consensus

Curriculum Topic 11:   Patient Care and Health Care System

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Health Care System and Management	76	3.0	0.8	3	3	2	Non-consensus
2. Health Care Quality and Standards	79	3.2	0.8	3	4	1	Consensus

Curriculum Topic 12:   Professionalism

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Professional Ethics and Behaviour	96	3.8	0.5	4	4	1	Consensus
2. Professionalism Development	94	3.6	0.6	4	4	2	Consensus
3. Personal and Professional Skills: Content Knowledge and Expertise	90	3.4	0.8	4	4	4	Consensus
4. Personal and Professional Skills: Clinical and Technical Skills	89	3.4	0.8	4	4	5	Consensus
5. Personal and Professional Skills: Evidence-Based Practice	86	3.4	0.8	4	4	7	Consensus
6. Personal and Professional Skills: Evidence-Based Education	92	3.4	0.7	4	4	3	Consensus
7. Personal and Professional Skills: Communication and Interpersonal Skills	92	3.6	0.6	4	4	3	Consensus
8. Personal and Professional Skills: Personal Management Skills	85	3.3	0.8	3	4	8	Consensus
9. Personal and Professional Skills: Career Skills	87	3.1	0.7	3	3	6	Non-consensus
10. Personal and Professional Skills: Personal and Professional Development	85	3.3	0.8	4	4	8	Consensus

Reliability (Cronbach's Alpha)

Curriculum Topic	Cronbach's Alpha
1. Educational Theories and Principles	0.68
2. Modes of Education	0.57
3. Learner's Issues	0.71
4. Educational Materials and Instructional Design	0.77
5. Assessment and Feedback	0.71
6. Curriculum	0.79
7. Evaluation	0.73
8. Educational Research	0.89
9. Educational Management	0.86
10. Quality Assurance	0.90
11. Patient Care and Health Care System	0.87
12. Professionalism	0.90
The Whole Questionnaire	**0.94**

Note: Reliability (α) of the whole questionnaire and of each curriculum topic were calculated from the first round questionnaire

Statistical Significance* between the Result and Demographic Information (Overview)

Curriculum Topic	Educational Content	Gender	Age	Country Area	Teaching Experience	Academic Position	UG Teaching Proportion	Educational Environment
Educational Theories and Principles	1. Learning Theories	-	-	-	0.044	-	-	-
	2. Learning Styles and Learning Approaches	-	-	-	0.006	-	-	M
	3. Learning Environment	-	-	-	-	-	-	-
	4. Reflective Practice	-	-	-	-	-	-	-
	5. Mentoring and Coaching	-	-	-	-	-	-	-
	6. Contemporary Teaching and Learning Methods	-	-	-	0.013	-	-	M
	7. Educational Strategies and Processes	-	-	-	-	-	-	-
Modes of Education	1. Large Group Teaching	-	-	-	-	-	-	-
	2. Small Group Teaching	-	-	-	-	-	-	-
	3. One-to-One Teaching	-	-	-	0.019	-	-	-
	4. Teaching in the Clinical Setting	-	-	-	-	-	-	-
	5. Outreach/Community Based/Workplace-Based Teaching	-	-	-	-	-	-	M
	6. Inter-/Multi-professional Teaching	-	-	-	-	-	-	-
Learner's Issues	1. Learner's Problems and Difficulties	-	-	-	-	-	-	-
	2. Support for Learners	-	-	-	-	-	-	M
	3. Learners with Special Needs	-	-	-	-	-	-	-
Educational Materials and Instructional Design	1. Learning Resources, Educational Media and Materials	-	-	-	-	-	-	-
	2. Instructional Design	-	-	-	-	-	-	-

Curriculum Topic	Educational Content	Gender	Age	Country Area	Teaching Experience	Academic Position	UG Teaching Proportion	Educational Environment
Assessment and Feedback	1. Assessment Principles	-	0.006	-	0.005	-	-	-
	2. Assessment Methods and Instruments	-	0.001	-	0.004	-	-	-
	3. Performance Assessment	-	-	-	0.005	-	-	-
	4. Self-Assessment	-	-	-	0.047	-	-	M
	5. Feedback	-	-	0.015	-	-	-	-
	6. Assessment Calibration	-	-	-	-	-	-	-
Curriculum	1. Curriculum Development	-	-	-	-	-	-	-
	2. Curriculum Implementation	-	-	-	-	-	-	-
	3. Programme and Course Development	-	-	-	-	-	-	-
Evaluation	1. Evaluation of Educational Programmes	-	-	-	-	-	-	-
	2. Teacher and Teaching Evaluation	-	-	-	-	-	-	-
Educational Research	1. Educational Research and Methods	-	-	-	-	-	-	-
	2. Research Components and Processes	-	-	-	-	-	-	-
Educational Management	1. Educational System and Dental Education	-	-	-	-	-	-	-
	2. Management and Organisation Principles in Dental Education	-	0.042	-	-	-	-	-
	3. Leadership and Teamwork	-	-	-	-	-	-	-
	4. Educational Change	-	-	-	-	-	-	-
	5. Student Recruitment and Admission	-	-	-	-	-	-	M
Quality Assurance	1. Principles of Audit, Quality, Standards and QA	-	-	-	-	-	-	-
	2. Local/National QA and Regulatory Bodies	-	-	-	-	-	-	-
	3. QA Implementation and Development	-	-	-	-	-	-	-

Curriculum Topic	Educational Content	Gender	Age	Country Area	Teaching Experience	Academic Position	UG Teaching Proportion	Educational Environment
Patient Care and Health Care System	1. Health Care System and Management	-	-	-	-	-	-	M
	2. Health Care Quality and Standards	-	-	-	-	-	-	M
Professionalism	1. Professional Ethics and Behaviour	-	-	0.031	-	-	-	-
	2. Professionalism Development	-	-	-	-	-	-	-
	3. Personal and Professional Skills: Content Knowledge and Expertise	0.023	-	-	-	-	-	-
	4. Personal and Professional Skills: Clinical and Technical Skills	-	-	-	-	-	-	M
	5. Personal and Professional Skills: Evidence-Based Practice	-	-	-	-	-	-	M
	6. Personal and Professional Skills: Evidence-Based Education	-	-	-	-	-	-	M
	7. Personal and Professional Skills: Communication and Interpersonal Skills	-	-	-	-	-	-	-
	8. Personal and Professional Skills: Personal Management Skills	-	-	-	-	-	-	-
	9. Personal and Professional Skills: Career Skills	-	-	-	-	-	-	-
	10. Personal and Professional Skills: Personal and Professional Development	-	-	-	-	-	-	-

* Statistical Significance = The distribution of opinions on that particular educational content is NOT the same across the categories of the demographic information (2-tailed confidence level = 95%)

** Mann-Whitney U Test was used for gender, academic position and educational environment, Kruskal-Wallis Test was used for age, country area, teaching experience and UG teaching proportion

*** M = see more information in the section "Details of Statistical Significance between the Result and Educational Environment"

Details of Statistical Significance between the Result and Gender

Item	Topic 11 Content 3: Personal and Professional Skills: Content Knowledge and Expertise
Result	Mean rank of the **male** group is **higher** than the **female** group (Sig = 0.023)

Details of Statistical Significance between the Result and Age

Item	Topic 5 Content 1: Assessment Principles
Result	Mean rank of the **age group 56 - 65** is **higher** than the **age group 26 – 35** (Bonferonni Sig = 0.011)

Item	Topic 5 Content 2: Assessment Methods and Instruments
Result	Mean rank of the **age group 56 - 65** is **higher** than the **age group 26 – 35** (Bonferonni Sig = 0.009)
	Mean rank of the **age group over 65** is **higher** than the **age group 56 – 65** (Bonferonni Sig = 0.018)

Item	Topic 9 Content 2: Management and Organisation Principles in Dental Education
Result	Kruskal-Wallis Test shows that there is the statistically significant difference amongst the categories but there is **no Bonferonni significance** in each pair of the categories

Details of Statistical Significance between the Result and Country Area

Item	Topic 5 Content 5: Feedback
Result	Kruskal-Wallis Test shows that there is the statistically significant difference amongst the categories but there is **no Bonferonni significance** in each pair of the categories

Item	Topic 12 Content 1: Professional Ethics and Behaviour
Result	Kruskal-Wallis Test shows that there is the statistically significant difference amongst the categories but there is **no Bonferonni significance** in each pair of the categories

Details of Statistical Significance between the Result and Teaching Experience

Item	Topic 1 Content 1: Learning Theories
Result	Mean rank of the **experienced educator group** (between 6 and 12 year as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.041)

Item	Topic 1 Content 2: Learning Styles and Learning Approaches
Result	Mean rank of the **experienced educator group** (between 6 and 12 year as a teacher) is **higher** than **the early career educator** group (up to 5 year as a teacher) (Bonferonni Sig = 0.007)
	Mean rank of the **mature educator** group (13 year and over as a teacher) is **higher** than the **early career educator** group (up to 5 year as a teacher) (Bonferonni Sig = 0.008)

Item	Topic 1 Content 6: Contemporary Teaching and Learning Methods
Result	Mean rank of the **experienced educator group** (between 6 and 12 year as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.021)
	Mean rank of the **mature educator group** (13 year and over as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.015)

Item	Topic 2 Content 3: One-to-One Teaching
Result	Mean rank of the **experienced educator group** (between 6 and 12 year as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.025)
	Mean rank of the **mature educator group** (13 year and over as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.025)

Item	Topic 5 Content 1: Assessment Principles
Result	Mean rank of the **experienced educator group** (between 6 and 12 year as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.031)
	Mean rank of the **mature educator group** (13 year and over as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.003)

Item	Topic 5 Content 2: Assessment Methods and Instruments
Result	Mean rank of the **experienced educator group** (between 6 and 12 year as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.040)
	Mean rank of the **mature educator group** (13 year and over as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.003)

Item	Topic 5 Content 3: Performance Assessment
Result	Mean rank of the **experienced educator group** (between 6 and 12 year as a teacher) is **higher** than the **early career educator** group (up to 5 year as a teacher) (Bonferonni Sig = 0.042)
	Mean rank of the **mature educator group** (13 year and over as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.003)

Item	Topic 5 Content 4: Self-Assessment
Result	Mean rank of the **experienced educator group** (between 6 and 12 year as a teacher) is **higher** than the **early career educator group** (up to 5 year as a teacher) (Bonferonni Sig = 0.041)

Details of Statistical Significance between the Result and Educational Environment

Item	Topic 1 Content 2: Learning Styles and Learning Approaches
Result	Mean rank of the educators who **involve in clinical-based** is **higher** than the educators who **do not involve in clinical-based** (Sig = 0.030)

Item	Topic 1 Content 6: Contemporary Teaching and Learning Methods
Result	Mean rank of the educators who **do not involve in other environments** is **higher** than the educators who **involve in other environments** (Sig = 0.009)

Item	Topic 2 Content 5: Outreach/Community Based/Workplace-Based Teaching
Result	Mean rank of the educators who **do not involve in laboratory-based** is **higher** than the educators who **involve in laboratory-based** (Sig = 0.014)

Item	Topic 3 Content 2: Support for Learners
Result	Mean rank of the educators who **involve in clinical-based** is **higher** than the educators who **do not involve in clinical-based** (Sig = 0.010)
Result	Mean rank of the educators who **do not involve in other environments** is **higher** than the educators who **involve in other environments** (Sig = 0.016)

Item	Topic 5 Content 4: Self-Assessment
Result	Mean rank of the educators who **involve in clinical-based** is **higher** than the educators who **do not involve in clinical-based** (Sig = 0.037)

Item	Topic 9 Content 5: Student Recruitment and Admission
Result	Mean rank of the educators who **involve in outreach-/community-/workplace-based** is **higher** than the educators who **do not involve in outreach-/community-/workplace-based** (Sig = 0.016)

Item	Topic 11 Content 1: Health Care System and Management
Result	Mean rank of the educators who **involve in laboratory-based** is **higher** than the educators who **do not involve in laboratory-based** (Sig = 0.014)

Item	Topic 11 Content 2: Health Care Quality and Standards
Result	Mean rank of the educators who **do not involve in clinical-based** is **higher** than the educators who **involve in clinical-based** (Sig = 0.029)
Result	Mean rank of the educators who **involve in other environments** is **higher** than the educators who **do not involve in other environments** (Sig = 0.012)

Item	Topic 12 Content 4: Personal and Professional Skills: Clinical and Technical Skills
Result	Mean rank of the educators who **do not involve in clinical-based** is **higher** than the educators who **involve in clinical-based** (Sig = 0.009)

Item	Topic 12 Content 5: Personal and Professional Skills: Evidence-Based Practice
Result	Mean rank of the educators who **do not involve in other environments** is **higher** than the educators who **involve in other environments** (Sig = 0.030)

Item	Topic 12 Content 6: Personal and Professional Skills: Evidence-Based Education
Result	Mean rank of the educators who **do not involve in other environments** is **higher** than the educators who **involve in other environments** (Sig = 0.029)

Appendix I

The final results

(Student panel)

Final Results of the Delphi Study (Student Panel)

Research Topic

Agreeing Curriculum Content for Developing Dental Educators in Europe

Consensus Criteria

1. Consensus Item (to be included in a curriculum) – an item which fulfils **all three criteria:**

   ➢ At least 70% of participants rated 3 or 4 on that item and
   ➢ Mean ≥ 3.2 and
   ➢ SD ≤ 1.0

2. Non-Consensus Item – an item which falls in **either category:**

   (a) 30 – 69% of participants rated 3 or 4 on that item

   or

   (b) At least 70% of participants rate 3 or 4 on that item **but**

   ➢ Mean < 3.2 or
   ➢ SD > 1.0

Note: In the next section, <mark>items highlighted in yellow</mark> indicate the category into which each non-consensus item falls)

3. Consensus Item (**not** to be included in a curriculum) – an item which achieves this following criterion:

   ➢ Less than 30% of participants rated 3 or 4 on that item

Numbers of Consensus and Non-Consensus Items

Curriculum Topic	Total Items	Consensus (Inclusion)	Non-consensus	Consensus (Exclusion)
1. Educational Theories and Principles	7	6	1	0
2. Modes of Education	6	4	1	1
3. Learner's Issues	3	1	2	0
4. Educational Materials and Instructional Design	2	2	0	0
5. Assessment and Feedback	6	5	1	0
6. Curriculum	3	3	0	0
7. Evaluation	2	2	0	0
8. Educational Research	2	1	1	0
9. Educational Management	5	4	1	0
10. Quality Assurance	3	3	0	0
11. Patient Care and Health Care System	2	2	0	0
12. Professionalism	10	10	0	0
Total	**51**	**43**	**7**	**1**

Details of Each Curriculum Topic

Curriculum Topic 1:   Educational Theories and Principles

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Learning Theories	94	3.5	0.6	4	4	2	Consensus
2. Learning Styles and Learning Approaches	84	3.3	0.7	3	3	6	Consensus
3. Learning Environment	88	<mark>3.1</mark>	0.6	3	3	4	<mark>Non-Consensus</mark>
4. Reflective Practice	95	3.6	0.6	4	4	1	Consensus
5. Mentoring and Coaching	92	3.6	0.6	4	4	3	Consensus
6. Contemporary Teaching and Learning Methods	87	3.4	0.8	4	4	5	Consensus
7. Educational Strategies and Processes	94	3.5	0.6	4	4	2	Consensus

Curriculum Topic 2: Modes of Education

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Large Group Teaching	21	1.9	0.9	2	1	5	Consensus
2. Small Group Teaching	95	3.6	0.6	4	4	2	Consensus
3. One-to-One Teaching	82	3.1	0.7	3	3	4	Non-consensus
4. Teaching in the Clinical Setting	97	3.7	0.5	4	4	1	Consensus
5. Outreach/ Community Based/ Workplace-Based Teaching	87	3.3	0.8	3	4	3	Consensus
6. Inter-/Multi-professional Teaching	87	3.3	0.7	3	4	3	Consensus

Curriculum Topic 3:   Learner's Issues

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Learner's Problems and Difficulties	82	3.1	0.8	3	3	2	Non-consensus
2. Support for Learners	92	3.4	0.6	3	3	1	Consensus
3. Learners with Special Needs	77	3.0	0.8	3	3	3	Non-consensus

Curriculum Topic 4:   Educational Materials and Instructional Design

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Learning Resources, Educational Media and Materials	87	3.4	0.7	4	4	2	Consensus
2. Instructional Design	88	3.2	0.7	3	3	1	Consensus

Curriculum Topic 5: **Assessment and Feedback**

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Assessment Principles	94	3.3	0.6	3	3	2	Consensus
2. Assessment Methods and Instruments	92	3.3	0.6	3	3	3	Consensus
3. Performance Assessment	92	3.5	0.6	4	4	3	Consensus
4. Self-Assessment	82	3.3	0.7	3	4	5	Consensus
5. Feedback	95	3.6	0.6	4	4	1	Consensus
6. Assessment Calibration	87	3.1	0.8	3	3	4	Non-consensus

Curriculum Topic 6: Curriculum

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Curriculum Development	90	3.5	0.7	4	4	2	Consensus
2. Curriculum Implementation	92	3.4	0.6	4	4	1	Consensus
3. Programme and Course Development	92	3.6	0.6	4	4	1	Consensus

Curriculum Topic 7: Evaluation

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Evaluation of Educational Programmes	95	3.4	0.6	3	4	1	Consensus
2. Teacher and Teaching Evaluation	95	3.5	0.6	4	4	1	Consensus

Curriculum Topic 8:   Educational Research

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Educational Research and Methods	84	3.2	0.7	3	3	1	Consensus
2. Research Components and Processes	82	3.1	0.7	3	3	2	Non-consensus

Curriculum Topic 9:   Educational Management

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Educational System and Dental Education	82	3.3	0.8	4	4	3	Consensus
2. Management and Organisation Principles in Dental Education s	85	3.3	0.8	3	4	2	Consensus
3. Leadership and Teamwork	82	3.2	0.7	3	3	3	Consensus
4. Educational Change	81	3.1	0.7	3	3	4	Non-consensus
5. Student Recruitment and Admission	88	3.4	0.7	4	4	1	Consensus

Curriculum Topic 10:   Quality Assurance

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Principles of Audit, Quality, Standards and QA	94	3.5	0.6	4	4	1	Consensus
2. Local/National QA and Regulatory Bodies	82	3.2	0.8	3	3	2	Consensus
3. QA Implementation and Development	94	3.6	0.6	4	4	1	Consensus

Curriculum Topic 11:   Patient Care and Health Care System

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Health Care System and Management	95	3.6	0.6	4	4	2	Consensus
2. Health Care Quality and Standards	100	3.7	0.5	4	4	1	Consensus

Curriculum Topic 12:   Professionalism

Educational Content	% Who Rated 3 or 4	Group Mean	SD	Median	Mode	Rank	Result
1. Professional Ethics and Behaviour	97	3.6	0.5	4	4	2	Consensus
2. Professionalism Development	92	3.6	0.6	4	4	5	Consensus
3. Personal and Professional Skills: Content Knowledge and Expertise	92	3.5	0.6	4	4	5	Consensus
4. Personal and Professional Skills: Clinical and Technical Skills	100	3.9	0.3	4	4	1	Consensus
5. Personal and Professional Skills: Evidence-Based Practice	95	3.6	0.6	4	4	3	Consensus
6. Personal and Professional Skills: Evidence-Based Education	92	3.4	0.6	3	4	5	Consensus
7. Personal and Professional Skills: Communication and Interpersonal Skills	97	3.5	0.5	4	4	2	Consensus
8. Personal and Professional Skills: Personal Management Skills	84	3.2	0.7	3	3	6	Consensus
9. Personal and Professional Skills: Career Skills	94	3.6	0.6	4	4	4	Consensus
10. Personal and Professional Skills: Personal and Professional Development	97	3.6	0.5	4	4	2	Consensus

Reliability (Cronbach's Alpha)

Curriculum Topic	Cronbach's Alpha
1. Educational Theories and Principles	0.76
2. Modes of Education	0.66
3. Learner's Issues	0.57
4. Educational Materials and Instructional Design	0.76
5. Assessment and Feedback	0.70
6. Curriculum	0.86
7. Evaluation	0.67
8. Educational Research	0.86
9. Educational Management	0.80
10. Quality Assurance	0.89
11. Patient Care and Health Care System	0.76
12. Professionalism	0.75
The Whole Questionnaire	**0.91**

Note: Reliability (α) of the whole questionnaire and of each curriculum topic were calculated from the first round questionnaire

Statistical Significance* between the Result and Demographic Information (Overview)

Curriculum Topic	Educational Content	Gender	Age	Country Area	Year of Study	Educational Environment
Educational Theories and Principles	1. Learning Theories	-	-	-	-	-
	2. Learning Styles and Learning Approaches	-	-	-	-	-
	3. Learning Environment	-	-	-	-	-
	4. Reflective Practice	-	-	-	-	-
	5. Mentoring and Coaching	-	-	-	-	M
	6. Contemporary Teaching and Learning Methods	-	-	-	-	-
	7. Educational Strategies and Processes	-	-	-	-	-
Modes of Education	1. Large Group Teaching	-	-	0.018	-	-
	2. Small Group Teaching	-	-	-	-	-
	3. One-to-One Teaching	-	-	-	0.048	-
	4. Teaching in the Clinical Setting	-	-	0.008	0.006	-
	5. Outreach/Community Based/Workplace-Based Teaching	-	-	0.030	0.017	-
	6. Inter-/Multi-professional Teaching	-	-	-	0.030	-
Learner's Issues	1. Learner's Problems and Difficulties	-	-	-	-	-
	2. Support for Learners	-	-	-	-	-
	3. Learners with Special Needs	-	-	-	-	-
Educational Materials and Instructional Design	1. Learning Resources, Educational Media and Materials	-	-	-	-	-
	2. Instructional Design	-	-	-	-	-

Curriculum Topic	Educational Content	Gender	Age	Country Area	Year of Study	Educational Environment
Assessment and Feedback	1. Assessment Principles	-	-	-	-	-
	2. Assessment Methods and Instruments	-	-	-	-	M
	3. Performance Assessment	-	-	0.037	-	M
	4. Self-Assessment	-	-	-	-	-
	5. Feedback	-	-	0.007	-	-
	6. Assessment Calibration	-	-	-	-	-
Curriculum	1. Curriculum Development	-	-	-	-	-
	2. Curriculum Implementation	-	-	-	-	M
	3. Programme and Course Development	-	-	-	-	-
Evaluation	1. Evaluation of Educational Programmes	-	-	-	-	-
	2. Teacher and Teaching Evaluation	-	-	-	-	-
Educational Research	1. Educational Research and Methods	-	-	0.041	-	-
	2. Research Components and Processes	-	-	-	-	-
Educational Management	1. Educational System and Dental Education	-	-	0.027	-	-
	2. Management and Organisation Principles in Dental Education	-	-	-	-	-
	3. Leadership and Teamwork	-	-	-	-	-
	4. Educational Change	-	-	-	-	-
	5. Student Recruitment and Admission	-	-	-	-	-
Quality Assurance	1. Principles of Audit, Quality, Standards and QA	-	-	-	-	-
	2. Local/National QA and Regulatory Bodies	-	-	-	-	-
	3. QA Implementation and Development	-	-	-	-	-

Curriculum Topic	Educational Content	Gender	Age	Country Area	Year of Study	Educational Environment
Patient Care and Health Care System	1. Health Care System and Management	-	-	-	-	-
	2. Health Care Quality and Standards	-	-	0.041	-	-
Professionalism	1. Professional Ethics and Behaviour	-	-	0.002	-	-
	2. Professionalism Development	-	-	-	-	-
	3. Personal and Professional Skills: Content Knowledge and Expertise	-	-	-	-	-
	4. Personal and Professional Skills: Clinical and Technical Skills	-	-	-	-	-
	5. Personal and Professional Skills: Evidence-Based Practice	-	-	-	-	-
	6. Personal and Professional Skills: Evidence-Based Education	-	-	-	-	M
	7. Personal and Professional Skills: Communication and Interpersonal Skills	-	-	-	-	-
	8. Personal and Professional Skills: Personal Management Skills	-	-	-	-	-
	9. Personal and Professional Skills: Career Skills	-	-	-	-	-
	10. Personal and Professional Skills: Personal and Professional Development	-	-	-	-	-

* Statistical Significance = The distribution of opinions on that particular educational content is NOT the same across the categories of the demographic information (2-tailed confidence level = 95%)

** Mann-Whitney U Test was used for gender, age, and educational environment, Kruskal-Wallis Test was used for country area and year of study

*** M = see more information in the section "Details of Statistical Significance between the Result and Educational Environment"

Details of Statistical Significance between the Result and Country Area

Item	Topic 2 Content 1: Large Group Teaching
Result	Mean rank of educators from **Northern Europe** is **higher** than educators from **Southern Europe** (Bonferonni Sig = 0.020)

Item	Topic 2 Content 4: Teaching in the Clinical Setting
Result	Mean rank of educators from **Northern Europe** is **higher** than educators from **Eastern Europe** (Bonferonni Sig = 0.004)

Item	Topic 2 Content 5: Outreach/Community Based/Workplace-Based Teaching
Result	Mean rank of educators from **Northern Europe** is **higher** than educators from **Eastern Europe** (Bonferonni Sig = 0.028)

Item	Topic 5 Content 3: Performance Assessment
Result	Kruskal-Wallis Test shows that there is the statistically significance difference amongst the categories but there is **no Bonferonni significance** in each pair of the categories

Item	Topic 5 Content 5: Feedback
Result	Mean rank of educators from **Northern Europe** is **higher** than educators from **Southern Europe** (Bonferonni Sig = 0.005)

Item	Topic 8 Content 1: Educational Research and Methods
Result	Kruskal-Wallis Test shows that there is the statistically significance difference amongst the categories but there is **no Bonferonni significance** in each pair of the categories

Item	Topic 9 Content 1: Educational System and Dental Education
Result	Kruskal-Wallis Test shows that there is the statistically significance difference amongst the categories but there is **no Bonferonni significance** in each pair of the categories

Item	Topic 11 Content 2: Health Care Quality and Standards
Result	Kruskal-Wallis Test shows that there is the statistically significance difference amongst the categories but there is **no Bonferonni significance** in each pair of the categories

Item	Topic 12 Content 1: Professional Ethics and Behaviour
Result	Mean rank of educators from **Southern Europe** is **higher** than educators from **Western Europe** (Bonferonni Sig = 0.010)
	Mean rank of educators from **Southern Europe** is **higher** than educators from **Northern Europe** (Bonferonni Sig = 0.029)

Details of Statistical Significance between the Result and Year of Study

Item	Topic 2 Content 3: One-to-One Teaching
Result	Kruskal-Wallis Test shows that there is the statistically significance difference amongst the categories but there is **no Bonferonni significance** in each pair of the categories

Item	Topic 2 Content 4: Teaching in the Clinical Setting
Result	Mean rank of the **fourth year students** is **higher** than the **fourth year students** (Sig = 0.033)

Item	Topic 2 Content 5: Outreach/Community Based/Workplace-Based Teaching
Result	Kruskal-Wallis Test shows that there is the statistically significance difference amongst the categories but there is **no Bonferonni significance** in each pair of the categories

Item	Topic 2 Content 6: Inter-/Multi-professional Teaching
Result	Kruskal-Wallis Test shows that there is the statistically significance difference amongst the categories but there is **no Bonferonni significance** in each pair of the categories

Details of Statistical Significance between the Result and Educational Environment

Item	Topic 1 Content 5: Mentoring and Coaching
Result	Mean rank of the students who **involve in classroom-based** is **higher** than the students who **do not involve in classroom-based** (Sig = 0.031)

Item	Topic 5 Content 2: Assessment Methods and Instruments
Result	Mean rank of the students who **do not involve in other environments** is **higher** than the students who **involve in other environments** (Sig = 0.024)

Item	Topic 5 Content 3: Performance Assessment
Result	Mean rank of the students who **involve in classroom-based** is **higher** than the students who **do not involve in classroom-based** (Sig = 0.031)

Item	Topic 6 Content 2: Curriculum Implementation
Result	Mean rank of the students who **involve in classroom-based** is **higher** than the students who **do not involve in classroom-based** (Sig = 0.041)

Item	Topic 12 Content 6: Personal and Professional Skills: Evidence-Based Education
Result	Mean rank of the students who **involve in classroom-based** is **higher** than the students who **do not involve in classroom-based** (Sig = 0.013)

Appendix J

The results from supplementary questionnaire

(Student panel)

Results of the Supplementary Questionnaire (Student Panel)

Question 1

According to the "content which should be included in the curriculum", do you agree that all these are important?

      Agree   =   100% (N=11)

      Disagree   =   0%

Question 2

According to the "Educational content which has not yet achieved the consensus", which do you think are important or are not important for educators in order to provide high quality education and be able to support student learning?

Educational Content	Total (N)	Important	Not Important	Comment
1. Learning Theories	10	9 (90%)	1 (10%)	
2. Learning Environment	10	9 (90%)	1 (10%)	A positive and happy lecturing environment is essential for success. (P5) Up to date teaching - using new technology is seldom found. (P6)
3. Educational Strategies and Processes	9	6 (66.7%)	3 (33.3%)	
4. One-to-One Teaching	11	8 (72.7%)	3 (27.3%)	It is hard to do this. (P9)
5. Learner's Problems and Difficulties	10	7 (70%)	3 (30%)	If a student is struggling with something, it is important that there is support in place to help them through dental school. (P5)

Supachai Chuenjitwongsa   Appendix J

Educational Content	Total (N)	Important	Not Important	Comment
6. Learners with Special Needs	9	9 (100%)	0 (0%)	Everything should be made to help them. (P6)
7. Instructional Design	11	6 (54.5%)	5 (45.5%)	
8. Assessment Principles	10	7 (70%)	3 (30%)	
9. Assessment Calibration	9	5 (55.6%)	4 (44.4%)	Depends on the teacher. It should not be standard. (P6)
10. Research Components and Processes	10	9 (90%)	1 (10%)	
11. Educational Change	11	7 (63.6%)	4 (36.4%)	
12. Student Recruitment and Admission	10	8 (80%)	2 (20%)	
13. Principles of Audit, Quality, Standards and QA	9	7 (77.8%)	2 (22.2%)	
14. QA Implementation and Development	9	7 (77.8%)	2 (22.2%)	
15. Career Skills	11	10 (90.9%)	1 (9.1%)	Support for the future beyond dental school is very important. (P5) In France, hereby, anything is taught. (P6)

Question 3

According to the "Educational content which educators does not need to be included in the curriculum", do you agree with the result that educators do not need to learn about "how to teach in large-group" or "how to lecture"?

- ➢ I do not agree with this because I have experienced quite many times that the educators fail to lecture well because they have not had the training in lecturing big groups. (P1)

- ➢ There is a need for effective communication in large lecture environment. (P2)

- ➢ I disagree and feel it is important for educators to learn about both "How to teach in large-group" and "How to lecture" so that the content is being delivered in the best, most accessible manner possible to maximise understanding and hence successful learning. (P5)

- ➢ I think they should. We always can learn something about communication skills. (P6)

Demographic Information

Information		N	%
1. Number of participants		11	
2. Gender	Male	3	27.3
	Female	8	72.7
3. Age	Below 20	1	9.1
	21 – 30	10	90.9
4. Country	Eastern Europe	1	9.1
	Northern Europe	6	54.5
	Southern Europe	3	27.3
	Western Europe	1	9.1
5. Year of Study	First Year	2	18.2
	Second Year	2	18.2
	Third Year	3	27.3
	Fourth Year	2	18.2
	Fifth Year	1	9.1
	Sixth Year	1	9.1

Supachai Chuenjitwongsa   Appendix J

Information		N	%
6. Educational Environment which the participants have been involved or experienced	Classroom-Based	11	100
	Laboratory-Based	6	54.5
	Clinical-Based	9	81.8
	Outreach / Community / Workplace-Based	7	63.6
	Other	-	-

Appendix K

The final results

(Compare educator and student panel)

Final Results of the Delphi Study

(Compare Educator and Student Panel)

Research Topic

Agreeing Curriculum Content for Developing Dental Educators in Europe

Consensus Criteria

1. Consensus Item (to be included in a curriculum) – an item which fulfils **all three criteria:**

    ➢ At least 70% of participants rated 3 or 4 on that item and
    ➢ Mean ≥ 3.2 and
    ➢ SD ≤ 1.0

2. Non-Consensus Item – an item which falls in **either category:**

    (a) 30 – 69% of participants rated 3 or 4 on that item

    or

    (b) At least 70% of participants rate 3 or 4 on that item **but**

    ➢ Mean < 3.2 or
    ➢ SD > 1.0

Note: In the next section, <mark>items highlighted in yellow</mark> indicate the category into which each non-consensus item falls)

3. Consensus Item (**not** to be included in a curriculum) – an item which achieves this following criterion:

    ➢ Less than 30% of participants rated 3 or 4 on that item

Numbers of Consensus and Non-Consensus Items

Curriculum Topic	Number of Items	Educator Panel			Student Panel		
		Consensus (Include)	Non-Consensus	Consensus (Exclude)	Consensus (Include)	Non-Consensus	Consensus (Exclude)
1. Educational Theories and Principles	7	7	0	0	6	1	0
2. Modes of Education	6	3	3	0	4	1	1
3. Learner's Issues	3	2	1	0	1	2	0
4. Educational Materials and Instructional Design	2	2	0	0	2	0	0
5. Assessment and Feedback	6	6	0	0	5	1	0
6. Curriculum	3	3	0	0	3	0	0
7. Evaluation	2	2	0	0	2	0	0
8. Educational Research	2	0	2	0	1	1	0
9. Educational Management	5	1	4	0	4	1	0
10. Quality Assurance	3	2	1	0	3	0	0
11. Patient Care and Health Care System	2	1	1	0	2	0	0
12. Professionalism	10	9	1	0	10	0	0
Total	**51**	**38**	**13**	**0**	**43**	**7**	**1**

Details of Each Curriculum Topic

Curriculum Topic 1:   Educational Theories and Principles

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	
1. Learning Theories	91	3.4	0.7	6	**CI**	94	3.5	0.6	2	**CI**	**NS** (p=0.708)
2. Learning Styles and Learning Approaches	96	3.6	0.6	3	**CI**	84	3.3	0.7	6	**CI**	**S** (p=0.031)
3. Learning Environment	94	3.3	0.6	4	**CI**	88	3.1	0.6	4	**NC**	**NS** (p=0.184)
4. Reflective Practice	100	3.7	0.5	1	**CI**	95	3.6	0.6	1	**CI**	**NS** (p=0.636)
5. Mentoring and Coaching	98	3.6	0.5	2	**CI**	92	3.6	0.6	3	**CI**	**NS** (p=0.942)
6. Contemporary Teaching and Learning Methods	91	3.5	0.7	6	**CI**	87	3.4	0.8	5	**CI**	**NS** (p=0.288)
7. Educational Strategies and Processes	92	3.5	0.6	5	**CI**	94	3.5	0.6	2	**CI**	**NS** (p=0.852)

CI =   Consensus (Inclusion)   CE =   Consensus (Exclusion)

NC =   Non-Consensus

Blue highlight indicates the category into which each non-consensus item falls

S =   Significant difference of median ranks (Mann-Whitney U test) of that item

between educator and student panel at 95% confidence level (p < 0.05)

NS =   No significant difference of median ranks (Mann-Whitney U test) of that item

between educator and student panel at 95% confidence level (p ≥ 0.05)

Curriculum Topic 2:   Modes of Education

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	Result	% Who Rated 3 or 4	Mean	SD	Rank	Result	
1. Large Group Teaching	64	2.7	0.8	6	**NC**	21	1.9	0.9	5	**CE**	**S** (p=0.000)
2. Small Group Teaching	98	3.7	0.6	2	**CI**	95	3.6	0.6	2	**CI**	**NS** (p=0.281)
3. One-to-One Teaching	79	3.3	0.9	5	**CI**	82	3.1	0.7	4	**NC**	**NS** (p=0.273)
4. Teaching in the Clinical Setting	98	3.8	0.4	1	**CI**	97	3.7	0.5	1	**CI**	**NS** (p=0.181)
5. Outreach/Community Based/Workplace-Based Teaching	81	3.0	0.6	4	**NC**	87	3.3	0.8	3	**CI**	**S** (p=0.039)
6. Inter-/Multi-professional Teaching	89	3.1	0.6	3	**NC**	87	3.3	0.7	3	**CI**	**NS** (p=0.79)

Curriculum Topic 3:   **Learner's Issues**

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	
1. Learner's Problems and Difficulties	92	3.5	0.6	1	**CI**	82	3.1	0.8	2	**NC**	**NS** (p=0.085)
2. Support for Learners	92	3.4	0.6	1	**CI**	92	3.4	0.6	1	**CI**	**NS** (p=0.826)
3. Learners with Special Needs	64	2.7	0.7	2	**NC**	77	3.0	0.8	3	**NC**	**NS** (p=0.127)

Curriculum Topic 4:   **Educational Materials and Instructional Design**

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	
1. Learning Resources, Educational Media and Materials	94	3.6	0.6	1	**CI**	87	3.4	0.7	2	**CI**	**S** (p=0.044)
2. Instructional Design	91	3.3	0.7	2	**CI**	88	3.2	0.7	1	**CI**	**NS** (p=0.500)

Curriculum Topic 5:   **Assessment and Feedback**

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	
1. Assessment Principles	91	3.6	0.7	4	**CI**	94	3.3	0.6	2	**CI**	**S** (p=0.033)
2. Assessment Methods and Instruments	94	3.6	0.6	3	**CI**	92	3.3	0.6	3	**CI**	**S** (p=0.008)
3. Performance Assessment	98	3.7	0.5	2	**CI**	92	3.5	0.6	3	**CI**	**NS** (p=0.225)
4. Self-Assessment	98	3.6	0.5	2	**CI**	82	3.3	0.7	5	**CI**	**S** (p=0.025)
5. Feedback	98	3.8	0.4	2	**CI**	95	3.6	0.6	1	**CI**	**S** (p=0.037)
6. Assessment Calibration	100	3.6	0.5	1	**CI**	87	3.1	0.8	4	**NC**	**S** (p=0.008)

Curriculum Topic 6:   Curriculum

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	
1. Curriculum Development	83	3.3	0.8	3	**CI**	90	3.5	0.7	2	**CI**	**NS** (p=0.132)
2. Curriculum Implementation	87	3.2	0.7	2	**CI**	92	3.4	0.6	1	**CI**	**NS** (p=0.185)
3. Programme and Course Development	96	3.6	0.6	1	**CI**	92	3.6	0.6	1	**CI**	**NS** (p=0.566)

Curriculum Topic 7:   Evaluation

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	% Who Rated 3 or 4	Mean	SD	Rank	**Result**	
1. Evaluation of Educational Programmes	88	3.6	0.7	2	**CI**	95	3.4	0.6	1	**CI**	**NS** (p=0.089)
2. Teacher and Teaching Evaluation	92	3.6	0.6	1	**CI**	95	3.5	0.6	1	**CI**	**NS** (p=0.400)

Curriculum Topic 8: **Educational Research**

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	Result	% Who Rated 3 or 4	Mean	SD	Rank	Result	
1. Educational Research and Methods	82	3.1	0.8	1	NC	84	3.2	0.7	1	CI	**NS** (p=0.457)
2. Research Components and Processes	72	3.0	0.8	2	NC	82	3.1	0.7	2	NC	**NS** (p=0.871)

Curriculum Topic 9: **Educational Management**

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	Result	% Who Rated 3 or 4	Mean	SD	Rank	Result	
1. Educational System and Dental Education	74	3.0	0.7	3	NC	82	3.3	0.8	3	CI	**NS** (p=0.065)
2. Management and Organisation Principles in Dental Education	64	2.8	0.8	5	NC	85	3.3	0.8	2	CI	**S** (p=0.006)
3. Leadership and Teamwork	87	3.3	0.8	1	CI	82	3.2	0.7	3	CI	**NS** (p=0.832)
4. Educational Change	76	3.0	0.8	2	NC	81	3.1	0.7	4	NC	**NS** (p=0.844)
5. Student Recruitment and Admission	67	2.9	0.9	4	NC	88	3.4	0.7	1	CI	**S** (p=0.024)

Curriculum Topic 10:   Quality Assurance

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	Result	% Who Rated 3 or 4	Mean	SD	Rank	Result	
1. Principles of Audit, Quality, Standards and QA	77	3.2	0.8	2	CI	94	3.5	0.6	1	CI	**NS** (p=0.367)
2. Local/National QA and Regulatory Bodies	79	3.0	0.8	1	NC	82	3.2	0.8	2	CI	**NS** (p=0.417)
3. QA Implementation and Development	75	3.2	0.8	3	CI	94	3.6	0.6	1	CI	**NS** (p=0.080)

Curriculum Topic 11:   Patient Care and Health Care System

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	Result	% Who Rated 3 or 4	Mean	SD	Rank	Result	
1. Health Care System and Management	76	3.0	0.8	2	NC	95	3.6	0.6	2	CI	**S** (p=0.002)
2. Health Care Quality and Standards	79	3.2	0.8	1	CI	100	3.7	0.5	1	CI	**S** (p=0.001)

Curriculum Topic 12:   Professionalism

Educational Content	Educator Panel					Student Panel					Significant Difference
	% Who Rated 3 or 4	Mean	SD	Rank	Result	% Who Rated 3 or 4	Mean	SD	Rank	Result	
1. Professional Ethics and Behaviour	96	3.8	0.5	1	CI	97	3.6	0.5	2	CI	**NS** (p=0.205)
2. Professionalism Development	94	3.6	0.6	2	CI	92	3.6	0.6	5	CI	**NS** (p=0.675)
3. Personal and Professional Skills: Content Knowledge and Expertise	90	3.4	0.8	4	CI	92	3.5	0.6	5	CI	**NS** (p=0.833)
4. Personal and Professional Skills: Clinical and Technical Skills	89	3.4	0.8	5	CI	100	3.9	0.3	1	CI	**S** (p=0.001)
5. Personal and Professional Skills: Evidence-Based Practice	86	3.4	0.8	7	CI	95	3.6	0.6	3	CI	**NS** (p=0.266)
6. Personal and Professional Skills: Evidence-Based Education	92	3.4	0.7	3	CI	92	3.4	0.6	5	CI	**NS** (p=0.676)
7. Personal and Professional Skills: Communication and Interpersonal Skills	92	3.6	0.6	3	CI	97	3.5	0.5	2	CI	**NS** (p=0.452)
8. Personal and Professional Skills: Personal Management Skills	85	3.3	0.8	8	CI	84	3.2	0.7	6	CI	**NS** (p=0.729)
9. Personal and Professional Skills: Career Skills	87	3.1	0.7	6	NC	94	3.6	0.6	4	CI	**S** (p=0.018)
10. Personal and Professional Skills: Personal and Professional Development	85	3.3	0.8	8	CI	97	3.6	0.5	2	CI	**NS** (p=0.231)

Ranking of All Educational Content by % who rated 3 or 4 (when mean is included in the consensus criteria)

Curriculum Topic	Educational Content	Educator Panel				Student Panel			
		Rank	% Who Rated 3 or 4	Mean	Result	Rank	% Who Rated 3 or 4	Mean	Result
Educational Theories and Principles	1. Learning Theories	6	91	3.4	CI	4	94	3.5	CI
	2. Learning Styles and Learning Approaches	3	96	3.6	CI	10	84	3.3	CI
	3. Learning Environment	4	94	3.3	CI	7	88	3.1	NC
	4. Reflective Practice	1	100	3.7	CI	3	95	3.6	CI
	5. Mentoring and Coaching	2	98	3.6	CI	5	92	3.6	CI
	6. Contemporary Teaching and Learning Methods	6	91	3.5	CI	8	87	3.4	CI
	7. Educational Strategies and Processes	5	92	3.5	CI	4	94	3.5	CI
Modes of Education	1. Large Group Teaching	23	64	2.7	NC	14	21	1.9	CE
	2. Small Group Teaching	2	98	3.7	CI	3	95	3.6	CI
	3. One-to-One Teaching	16	79	3.3	CI	11	82	3.1	NC
	4. Teaching in the Clinical Setting	2	98	3.8	CI	2	97	3.7	CI
	5. Outreach/Community Based/Workplace-Based Teaching	15	81	3.0	NC	8	87	3.3	CI
	6. Inter-/Multi-professional Teaching	8	89	3.1	NC	8	87	3.3	CI
Learner's Issues	1. Learner's Problems and Difficulties	5	92	3.5	CI	11	82	3.1	NC
	2. Support for Learners	5	92	3.4	CI	5	92	3.4	CI
	3. Learners with Special Needs	23	64	2.7	NC	13	77	3.0	NC
Educational Materials and Instructional Design	1. Learning Resources, Educational Media and Materials	4	94	3.6	CI	8	87	3.4	CI
	2. Instructional Design	6	91	3.3	CI	7	88	3.2	CI

Curriculum Topic	Educational Content	Educator Panel				Student Panel			
		Rank	% Who Rated 3 or 4	Mean	Result	Rank	% Who Rated 3 or 4	Mean	Result
Assessment and Feedback	1. Assessment Principles	6	91	3.6	CI	4	94	3.3	CI
	2. Assessment Methods and Instruments	4	94	3.6	CI	5	92	3.3	CI
	3. Performance Assessment	2	98	3.7	CI	5	92	3.5	CI
	4. Self-Assessment	2	98	3.6	CI	11	82	3.3	CI
	5. Feedback	2	98	3.8	CI	3	95	3.6	CI
	6. Assessment Calibration	1	100	3.6	CI	8	87	3.1	NC
Curriculum	1. Curriculum Development	13	83	3.3	CI	6	90	3.5	CI
	2. Curriculum Implementation	10	87	3.2	CI	5	92	3.4	CI
	3. Programme and Course Development	3	96	3.6	CI	5	92	3.6	CI
Evaluation	1. Evaluation of Educational Programmes	9	88	3.6	CI	3	95	3.4	CI
	2. Teacher and Teaching Evaluation	5	92	3.6	CI	3	95	3.5	CI
Educational Research	1. Educational Research and Methods	14	82	3.1	NC	10	84	3.2	CI
	2. Research Components and Processes	21	72	3.0	NC	11	82	3.1	NC
Educational Management	1. Educational System and Dental Education	20	74	3.0	NC	11	82	3.3	CI
	2. Management and Organisation Principles in Dental Education	23	64	2.8	NC	9	85	3.3	CI
	3. Leadership and Teamwork	10	87	3.3	CI	11	82	3.2	CI
	4. Educational Change	18	76	3.0	NC	12	81	3.1	NC
	5. Student Recruitment and Admission	22	67	2.9	NC	7	88	3.4	CI
Quality Assurance	1. Principles of Audit, Quality, Standards and QA	17	77	3.2	CI	4	94	3.5	CI
	2. Local/National QA and Regulatory Bodies	16	79	3.0	NC	11	82	3.2	CI
	3. QA Implementation and Development	19	75	3.2	CI	4	94	3.6	CI

Curriculum Topic	Educational Content	Educator Panel				Student Panel			
		Rank	% Who Rated 3 or 4	Mean	Result	Rank	% Who Rated 3 or 4	Mean	Result
Patient Care and Health Care System	1. Health Care System and Management	18	76	3.0	NC	3	95	3.6	CI
	2. Health Care Quality and Standards	16	79	3.2	CI	1	100	3.7	CI
Professionalism	1. Professional Ethics and Behaviour	3	96	3.8	CI	2	97	3.6	CI
	2. Professionalism Development	4	94	3.6	CI	5	92	3.6	CI
	3. Personal and Professional Skills: Content Knowledge and Expertise	7	90	3.4	CI	5	92	3.5	CI
	4. Personal and Professional Skills: Clinical and Technical Skills	8	89	3.4	CI	1	100	3.9	CI
	5. Personal and Professional Skills: Evidence-Based Practice	11	86	3.4	CI	3	95	3.6	CI
	6. Personal and Professional Skills: Evidence-Based Education	5	92	3.4	CI	5	92	3.4	CI
	7. Personal and Professional Skills: Communication and Interpersonal Skills	5	92	3.6	CI	2	97	3.5	CI
	8. Personal and Professional Skills: Personal Management Skills	12	85	3.3	CI	10	84	3.2	CI
	9. Personal and Professional Skills: Career Skills	10	87	3.1	NC	4	94	3.6	CI
	10. Personal and Professional Skills: Personal and Professional Development	12	85	3.3	CI	2	97	3.6	CI

Reliability (Cronbach's Alpha)

Curriculum Topic	Educator	Student
1. Educational Theories and Principles	0.68	0.76
2. Modes of Education	0.57	0.66
3. Learner's Issues	0.71	0.57
4. Educational Materials and Instructional Design	0.77	0.76
5. Assessment and Feedback	0.71	0.70
6. Curriculum	0.79	0.86
7. Evaluation	0.73	0.67
8. Educational Research	0.89	0.86
9. Educational Management	0.86	0.80
10. Quality Assurance	0.90	0.89
11. Patient Care and Health Care System	0.87	0.76
12. Professionalism	0.90	0.75
The Whole Questionnaire	**0.94**	**0.91**

Comparison of Demographic Information (Round 1)

Information		Educator		Student	
		N	%	N	%
1. Number of participants		53		39	
2. Gender	Male	33	62.3	15	38.4
	Female	20	37.7	23	59.0
	No Information	-	-	1	2.6
3. Country	Eastern Europe	3	5.7	6	15.4
	Northern Europe	27	50.9	16	41.0
	Southern Europe	6	11.3	15	38.5
	Western Europe	17	32.1	2	5.1
4. Educational Environment which the participants have been involved or experienced	Classroom-Based	40	75.5	35	89.7
	Laboratory-Based	17	32.1	31	79.5
	Clinical-Based	33	62.3	39	100
	Outreach / Community / Workplace-Based	9	17.0	18	46.1
	Other	10	18.9	4	10.2

Specific Demographic Information (Educator Panel Round 1)

1. Age   26 – 35   =   3   (5.7 %)

                  36 – 45   =   8   (15.1 %)

                  46 – 55   =   21   (39.6 %)

                  56 – 65   =   16   (30.2 %)

                  Over 65   =   5   (9.4 %)

2. Teaching Experience

                  Up to 5 years   =   5   (9.4 %)

                  Between 6 and 12 years   =   9   (17.0 %)

                  More than 13 years   =   39   (73.6 %)

3. Academic Position   Full-Time   =   39   (73.6 %)

                                   Part-Time   =   14   (26.4 %)

               ➢ Average Sessions/Week   =   6.3 (19 hrs.)

4. Proportion of the job which involves teaching undergraduate students

                  Less than 20 %   =   9   (17.0 %)

                  20 – 40   =   22   (41.5 %)

                  40 – 60   =   12   (22.6 %)

                  60 – 80   =   3   (5.7 %)

                  More than 80 %   =   7   (13.2 %)

Specific Demographic Information (Student Panel Round 1)

1. Age   Below 20   =   2   (5.1 %)

               21 – 30   =   37   (94.9 %)

2. Year of Study

           Second Year   =   1   (2.6 %)

           Third Year   =   4   (10.2 %)

           Fourth Year   =   18   (46.1 %)

           Fifth Year   =   15   (38.5 %)

           Sixth Year   =   1   (2.6 %)

Supachai Chuenjitwongsa   Appendix K

Comparison of Demographic Information (Round 2)

Information		Educator		Student	
		N	%	N	%
1. Number of participants		39 (73.6% response rate)		17 (43.6% response rate)	
2. Gender	Male	27	69.2	8	47.1
	Female	12	30.8	8	47.1
	No Information	-	-	1	5.9
3. Country	Eastern Europe	1	2.6	2	11.8
	Northern Europe	20	51.3	7	41.2
	Southern Europe	5	12.8	7	41.2
	Western Europe	13	33.3	1	5.9
4. Educational Environment which the participants have been involved or experienced	Classroom-Based	30	76.9	16	94.1
	Laboratory-Based	12	30.8	13	76.5
	Clinical-Based	23	59.0	17	100
	Outreach / Community / Workplace-Based	6	15.4	9	52.9
	Other	8	20.5	-	-

Specific Demographic Information (Educator Panel Round 2)

1. Age   26 – 35   =   3   (7.7 %)

            36 – 45   =   5   (12.8 %)

            46 – 55   =   16   (41.0 %)

            56 – 65   =   11   (28.2 %)

            Over 65   =   4   (10.3 %)

2. Teaching Experience

            Up to 5 years   =   5   (12.8 %)

            Between 6 and 12 years   =   5   (12.8 %)

            More than 13 years   =   29   (74.4 %)

3. Academic Position   Full-Time   =   28   (71.8 %)

                              Part-Time   =   11   (28.2 %)

➢ Average Sessions/Week   =   5.4 (16 hrs.)

4. Proportion of the job which involves teaching undergraduate students

            Less than 20 %   =   7   (17.9 %)

            20 – 40   =   18   (46.2 %)

            40 – 60   =   7   (17.9 %)

            60 – 80   =   2   (5.1 %)

            More than 80 %   =   5   (12.8 %)

Specific Demographic Information (Student Panel Round 2)

1. Age   Below 20   =   2   (11.8 %)

                 21 – 30   =   15   (88.2 %)

2. Year of Study

                 Second Year   =   1   (5.9 %)

                 Third Year   =   2   (11.8 %)

                 Fourth Year   =   7   (41.2 %)

                 Fifth Year   =   7   (41.2 %)

Appendix L

Initial qualitative analysis

(Paper-based)

Theme 1

General Comments

Each teacher has to develop his/her own personal ways to teach, but he/she needs a good theoretical basis to develop his/her own style. Contemporary Learning Methods vary from time to time, it is good to be aware of them, but they cannot be the only guideline. It is important to understand the overall educational strategies and processes, because personal teaching has to be in line with educational strategies. highlight the reflective practice because teaching without the proper communication and dialogue between teacher and student does not lead to deep learning. (E01)

It is important to prepare the student for life-long learning. This requires knowledge of learning principles. (E02)

The extent of the knowledge required is progressive – junior lectures need less than senior lectures who need less than professors; but all need an understanding of the basics – and these need to be evidence based not opinion based. (E03)

I think senior educators, department heads and so forth need more educational theory but this is not a requirement for ALL the clinical staff in a typical UK dental school clinic with several clinical staff of the same subject being present at the same time. Clinical teachers making a career of clinical teaching will need to learn more in the area of education. (E05)

All the above are important. (E10)

My experience tells me that clinicians are not fully aware of these concepts. (E15)

Modern healthcare educators require all of the above to ensure undergraduates receive expert tuition as required by practitioners of the future. (E17)

By understanding better how students learn, the curriculum and educational approach can be adjusted to improve learning. Assessments should match the learning process. Opportunities for rote learning should be avoided. (E18)

In teaching the teacher to help to develop a whole curriculum, I think these should all be included. If it is only about teaching the teacher to help to develop his or her own piece of teaching within the dental curriculum, this is my opinion. (E26)

Dentistry/medicine will change dramatically within the next 10 years but our approaches to these changes are not reflected in our education. Therefore the education per se has to be very good and needs to have a sound basis. (E29)

All essential areas to be covered in teaching teachers. (E33)

The background philosophical aspects are important, but the approaches and methods to learning are fundamental. (E36)

Education in dentistry for many years ran on the basis of people passing on opinions about how things should be done. In the era of evidence based practice, and a world in which disease patterns, patient expectations, and materials and technology are changing almost daily it is much more important to teach people how to learn than to simply fill them with today's facts (50% of which will be proven to be wrong within 10 years)(ref Sackett). (E45)

Supachai Chuenjitwongsa – 6th Feb 2013

Educational Theories

Educational theories able structural improvement of one's own skills and facilitate discussion around pedagogic issues in the whole unit. (E08)

All these suggestions are for me important for the curriculum. Learning theories should be taught but not at a high level. (E13)

Mentoring

These are theoretical subjects that are very important, I think mentoring and coaching needs more specificity, which theory on mentoring and coaching is this? (E20)

Reflective Practice

The use of reflective learning is a powerful aid to teaching. (E30)

Theme 2

The mode of teaching depends on the level of which the topic needs to be learned. The topics that need only "to be familiar with it" can be thought in large groups. Small group, one-to-one teaching and clinical setting is needed on most dental topics in which students need "competence" level of learning. Outreach/community and multi-professional teaching approach is needed, because dentistry has for too long time been separate from the community and other health professionals. E.g. the preventive approaches need to planned together with other health care professionals together with prevention of diabetes, over-weight, alcohol etc..., also the TMJ problems need to be taken care together with the medical professionals, not left for physicians... (E01)

This probably reflects my experience. Mixed classes, teaching basic and para-clinical subjects to students from 2-3 different student groups has been a disaster in this school. Small group teaching, including PBL is expensive, at least in the short term. Sometimes outreach teaching is helpful and gives experience, sometimes the students learn too well how to cut corners. Quality control of outreach clinical experience is sometimes difficult to monitor, in my experience at least. (E05)

Teaching in pre-clinical setting (or is that meant by e-learning?) (E07).

large group teaching can be the only way in some issues, but better learning can be gained in small groups and in dentistry one-to-one is teaching is essential in the complicated clinical procedures. (E08)

People learn in different ways so a mixture of all the above is necessary. (E10)

Supachai Chuenjitwongsa – 6th Feb 2013

Page 5

Handwritten margin notes:
LG - number of stu ↑ (1) - nice to know (2) topic - ineffective (3) - overview/outline (4)
out - ↑ situation to pt care (5) - dental school open up to society (6) - expensive + poorly evidence (7)
Mul - dent is a part of Gen He (8) - dent problem relate to other problem (9) - integration of K /sub - discipline (10)

I judge large group teaching optional but I recognize that when the number of students is very high it's the only mode you can use... The other modes seem to me essential. We need to increase the situations when our students take care of patients whatever the care is (prevention or therapeutic), so outreach are essential for me. Multi-professional teaching is essential too because with the number of old people increasing, we are not only oral professionals but general health ones. (E13)

These settings of learning should be in the curriculum. (E20)

depends on the application → good LG better than bad SG

All the modes are as good as its application is carried out: an excellent conference for a large number of students can be better than a poorly developed practical session in a lab with outdated technical material... (E41)

Large group teaching can be optional for "nice to know level" of learning, my opinion has not changed from the first round. Outreach teaching is to opportunity for the Dental Schools to open up to the society/community. Therefore it is at least desirable, almost essential. In that my opinion is stronger than in the first round. Multi-professional teaching is also essential at this stage. We know now that many oral/dental problems are related to the other health problems. No change in the opinion as compared to the first round. (E01-2)

Large groups are quite ineffective. Community based teaching is nice to show the student other situations, but not essential for basic training. Multi-professional training is important for the integration of knowledge of the sub-disciplines. (E02-2)

LGT - is good to give an overview/outline to large numbers. Outreach - is an expensive means of delivery of u/grad education. The basis for it is poorly evidenced and if 'school' teaching is used correctly, it surpasses outreach. (E03-2)

Page 6

Handwritten margin notes:
LG → joint teaching → dent prof. aspects are ignored (1) → useful in some cases (2)
SG → result in more reflective learning (3)
out → experience (4) → not available in some countries (6); teachers need to involve with in house staff (5); → useful in study of clin teaching (7)
Mul → dent is a moment of med (8)

Large group teaching in this small school implies joint teaching with other disciplines, usually in basic sciences. This has been a bad development as the special needs of dental education are ignored. Outreach training is OK if the quality of the training and experience can be guaranteed. So outreach teachers need to be involved with the in house staff. Sometimes this works well, sometimes not. We do not have any community clinics in this country, so the advantages of outreach clinical training are not all that clear. (E05-2)

I still judge that the two last items are essential in a curriculum for educators of dental students. I don't firmly condemn large group teaching, this can be useful in some cases. So I accept to modify my first answer for this item. (E13-2)

I feel that small group teaching is preferable and results in a more reflective learning process. Certain outreach learning can be very beneficial as has been shown in Europe. Dentistry is a branch of medicine and therefore we should have better links with our medical colleagues. (E30-2)

Some of the comments appear to be directed at an undergraduate curriculum, rather than a dental educators' curriculum. I suggest that large group teaching in a dental educators' curriculum is unlikely to be necessary. Teaching students in outreach settings may however be useful in the study of clinical teaching. (E47-2)

Clinical Teaching

Teaching dentistry esp. clinical is totally different to other disciplines (esp. medicine) as we are training students to the level of micro-surgeons and they undertake irreversible procedures on awake, aware patients who are stressed (as going to the dentists is not enjoyable). (E03)

clin. T in Dent diff. from other discipline → micro-surgery level, irreversible procedure, awake, aware pt. with stress

Page 7

Handwritten margin notes:
clin - dent diff from other discipline (1) → micro-surgery level → irreversible → awake, aware stressed pt (2); pt. staff need edu principle (3)
1-1 → focus → feedback (4)
Mul → difficult in practice (5)
out → required well trained staff (8) → edu in more reality (9)
→ student engagement (6); → staff - supportive (7)

Chairside clinical teachers a number who are part time require the theory behind education and learning/teaching styles. (E17)

PT staff need theory of edu/Tl-style

One-to-One

All your options are important. However, one-to-one should be more focused on giving feedback. (E15)

1-1 → focus on giving feedback

Inter/Multi

inter/mul → difficult in practice → students must engage well → staff need to be very supportive

Inter/multiprofessional education is desirable in theory but it is very difficult in practice to deliver units of a course that are interdisciplinary. If students do not engage well in interdisciplinary education it will fail. Staff form all the disciplines involved need to be very supportive otherwise it is doomed. Outreach/community-based/workplace teaching in well controlled environments is desirable/ It is not a quick fix solution. It requires well trained teachers similar to those part-tiem staff who supervise in dental hospital clinics. (E18)

out → require well trained teacher/school → give edu in more reality; PT staff (outreach)

All essential, except the inter-/multiprofessional training which I believe to be highly desirable but not essential in the dental curriculum. (E33)

Large Group

Large group teaching was invented in a time when knowledge was scarce and had to be distributed economically. But nowadays every kid has the whole knowledge of the world in his / her pocket (aka. smartphone). I don't condemn large group teaching. It is okay for short instructional periods, but not for transfer of huge amounts of knowledge. (E29)

LG → ok for short period → not ok for transfer of huge amounts of K

Page 8

Handwritten margin notes:
LG - ok for short period (1) - ok for subjects which do not need students interaction (2) - cannot avoid if there is not enough finance (3)
- effective if interactive ↑ (4) - passive learning (5) - optional as edu → coaching (6)

It's more effective if it can be interactive, which is difficult in a large group, but not impossible. (E07-2)

LG → effective if interactive ↑

Large group teaching encourages passive learning and so should not be the main mode of delivery of information. (E18-2)

LG → passive learning

LG → ok for some subjects which no student interaction require

Large group teaching is desirable for certain theoretical subjects, where no interaction with the students is desired. The methods for making this teaching mode more attractive and efficient could be the subject of the educators' course. (E22-2)

LG → aim to make teaching more attractive + efficient

For me teaching in large groups is still necessary because, at least in Germany, dental schools do not have enough financial means to pay enough educators so that large groups may be avoided. Apart from this, sometimes it is more effective to hold good lectures in large groups. For this the lecturer should know how to build up good lectures and how to awaken the interest of the students. (E27-2)

LG → cannot be avoid if there is not enough finance; → LG → how to build up good lecture → how to gain stu. interest

When your concept of education is changing towards coaching this mode of education is optional. (E31-2)

LG optional bcz. edu change to coaching mode

Despite the limitations of large group teaching, I am of the opinion that some is desirable. (E33-2)

Outreach

Outreach can give education more aspects of reality. (E08-2)

Theme 3

[Handwritten notes:]
- learners' diff vs teachers diff (1)
- how to deal with differences (2)
- type of students + needs for support (3)
- topic is important → students must be able to complete education (8)
- obligation (4) / imperative (5)
- equality + diversity → a must (6)

Instead of speaking of learners problems I would stress learners' differences. That is the issue we need to stress, and also teachers differences. In the post-postmodern society "the difference" is a value itself and we need to take this into account in teaching and find ways to deal with the difference even if we need to give good education to all of the students. To our experience about one third of students need support, in addition one third would benefit of it and one third can manage on their own easily. (E01)

[Handwritten:] learners' diff vs teachers diff (1); how to deal with difference (2); students {1/3 need support, 1/3 benefit from support, 1/3 can manage their problem} (3)

We are obliged to help with such problems and doing so has given us much positive feedback. (E05) *[(4) obligation for educators → get more +ve FB]*

[need specially trained person (7)]
Maybe a specially trained person could take care of this. (E07)

[Typo]*

[not many (1)]
As dentistry requires a large variety of skills there usually are not many learners with special needs. (E08)

[Equality + diversity → a must for all edu (6)]
Equality & diversity a must for all educators of any subject. (E17)

These are special subjects that are also desirable. (E20)

Learner's differences are important issue. Same opinion as in the first round! (E01-2)

[(5) imperative]
This is imperative. The world is not made of clones. 'Issues' might include dyslexia, for example or other factors that might actually prevent high achievement in

Supachai Chuenjitwongsa – 6th Feb 2013

[Handwritten notes:]
- need specially trained person (7)
- need to prioritise curriculum content → curriculum overload (9)
- depend on necessity (10)
- provided in adv course (11)

10

'conventional' education. It is not appropriate to remove content, of course and all students, with the right support, must be able to complete their education. (E11-2) (8)
[all students must be able to complete education → need this topic]

I don't modify my first choice. I agree that no one has to be left behind but when you build a curriculum you need to prioritize the items you want to teach otherwise the curriculum might be overloaded. This item is for me desirable but not essential. (E14-2) (9)
[→ need to prioritise the curriculum content first → curriculum overloaded]

[depend on time/period (10)]
This could be a subject depending on the necessity at each period (E22-2)

Agree with comments provided by other participants. (E33-2)

Although during the first round I considered this a desirable item, I now want to change my mind and make it an optional item. It is not wrong to include this into a basic course for educators, but better to take this as a separate item in an upgrading course thereafter. (E44-2) (11)
[→ provide as a separate item in adv. course.]

Special Needs

I am not sure that I fully understand what a learner with special needs is. (E13)

[more students → they need support]
More students are coming to universities with diagnosed learning difficulties and these students require a lot of support from staff. Some disabilities are such that they make it very difficult to be successful in the course. (E18) (4)

While all essential, the extent to which 'learners with special needs' should be covered may be limited given that individuals with certain special learning needs may not be best suited to a career in dentistry and as such may not be represented in the typical dental student body. (E34) (2) *[not many]*

Supachai Chuenjitwongsa – 6th Feb 2013

11

Only as far as the disabilities do not interfere with capabilities required during the later career. (E02-2)

[some disabilities are problematic]
It is harsh, but some learning disabilities may be detrimental to being a practicing dental professional. (E03-2) (7)

Sadly this is often difficult. We need to think not only of the needs of the learner but also of the patient. However, if a student gets admitted to the dental school, passes an entrance examination in our case, then we must help the student overcome any problem related to special needs. This can be a difficult matter to resolve. (E05-2) (5) *[must help student]*

[depends on the type/kind (6)]
Depending on the kind of special needs. (E09-2)

[Left margin: not all teachers need to know - it is for a specially trained person]

If we are talking about really special needs here, and not just different kinds of learning styles, I do not think that every teacher has to be an expert in this. As someone else already stated, a specially trained person could take care of this. As was also mentioned before, this group will not be large given that it does not fit well with a career as a dentist. (E27-2) (3) *[not many]* (8)(9)

[Handwritten summary:]
- there are not many students with special needs in dentistry (1),(2),(3)
- more students with special needs → they need support (4)
- educators must help students to overcome problems (5)
- depends on type/kind (6) /some disabilities are problematic (7)
- not all teachers need to be expertise (8)
- it is for a specially trained person (9)

Supachai Chuenjitwongsa – 6th Feb 2013

[Handwritten notes:]
- L resource → for SDL (1)
- respectful atmosphere (3)
- gap: materials vs needs (4) → need to be done by bodies (5)
- students have good skills in access (2)
- not for dent education but for edu. of dent educators (6)
- UG → more distant learning (7)
- F2F still important (8)
- emphasis on effective use of edu. mat. + instr. design (9)

12

Theme 4

[SDL require good access to L. resource (1)]
For effective self-directed learning a good access to learning resources is essential, (students may have better skills for that than teachers). In instructional design the respectful atmosphere is more important than the technically and decoratively proper settings. (E01) (3)
[students have better skills in access to L resource (2); respectful atmosphere → important]

[gap between materials and needs (4)]
There is an increasing gap between the amount, and quality, of teaching material available in dentistry, particularly in the pre-clinical subjects and the needs of teachers and students. More needs to be done by bodies such as ADEE, Universities, or even the Chief Dental Officers to improve this matter. (E05) *[→ bodies with power need to take action (5)]*

This could be more specific. (E07)

[PPT]
There's more to life than death by powerpoint. (E17)

This would not be necessary for developing dental educators, only for developing the educators of dental educators. (E25) (6) *[not for dev. dental educator but for educators of dent educator]*

I am not completely sure what is meant by instructional design. The description did not really help me. (E26)

[UG → more distance learning (7)]
Undergraduate dental education has become more of a distance learning protocol, but I don't think we should lose sight of the advantages of students learning together and reflecting on that learning. (E30) *[→ important of F2F → advantage of reflective learning (8)]*

[emphasis on effective use of edu. mat. + instr. design]
Essential given that the effective use of educational materials and instructional design are and will continue to be of increasing importance. (E33) (9)

Supachai Chuenjitwongsa – 6th Feb 2013

13

Theme 5

principle → for all (1)

mtd + instrument → topic to topic (vary) (4)

Assessment principles need to be equal for all, methods and instrument may vary from topic to topic. The performance assessment has to be honest, but respectful and discrete especially in the situation when something went wrong. The development of proper self-assessment needs and hones feed-back. Teachers have plenty to learn in all the aspects of assessment and this parts of the education has to be large with practical exercises. (E01)

performance (5) – honest – discrete – respectful

self-assessment → need honest FB (6)

require practical exercises (12)

level of K & responsibility (3)

the level of knowledge depends on the responsibility - again retrogressive, an increase in understanding is required as responsibly increases. (E03)

This is strongly pushed in this school and students clearly do benefit. Staff assessments are, on the other hand rather variable, uncontrolled and based on saving money rather than improving quality. (E05)

move to evaluation (theme 7)

Developing assessment. (E07)

good assessment → good learning (10)

Good assessment forms the basis for good learning. The learner needs to get feedback of his/her work to be able to develop. (E08)

(7) learner needs FB → development

principles → not very high level (2)

Assessment principles need to be developed in the curriculum but not at a very high level. The other items are more important in my opinion, particularly self-assessment and feedback. These two items are essential in "building" a good professional. (E13)

self-assessment & FB → building to a good professional (8)

Again another must as a number of chairside educators do not appear to grasp this aspect of their role. (E17)

chairside educators → lack of K in assessment (13)

Supachai Chuenjitwongsa – 6th Feb 2013

14

assessment → learning ∴ keep in line (11)

Assessment drives learning and so the assessments must be in keeping with the learning approach. (E18)

I think that assessment is the most important subject for teachers. You also need to add reflection (E20)

assessment → primary importance (9)

Skills in assessment are of 'PRIMARY IMPORTANCE' for dental educators. (E25)

The use of formative assessment as well as summative is desirable. (E30)

All essential as they are central to effective assessment. (E33)

Although I have been working in undergrad education of dentists for more than 30 years, I only recently understood very clearly how important valid assessment is. I am afraid that many assessments lack sufficient validity. (E44) *(14)*

many assessment → lack sufficient validity

Any programmes which do not include assessment calibration/standard open the door to subjectivity and therefore bias. (E45) *(15)*

assessment calibration/std → prevent subjectivity + bias

- assessment → 1st importance (9)
- principles → for all (1)
  → not at very high level (2)
- level of K & responsibility (3)
- mtd + instr → vary from topic to topic (4)
- perf. assess → honest/respectful/discrete (5)
- self-assess → need honest FB (6)
- FB → for development (7)
- self-assess + FB → a good professional (8)
- assessment calibration/std → prevent subjectivity + bias (15)

- assessment → learning (10,11)
- require practical exercise (12)
- chairside/clin educator lack of K in assessment (13)
- many assessment → lack sufficient validity (14)

Supachai Chuenjitwongsa – 6th Feb 2013

15

Theme 6

most teachers → focus on their own T and not see as a part of curriculum

It is my experience that most of the teachers only focus on their own teaching topic and do not see it as a part of the whole curriculum! The principles of the curriculum need to point to teachers, the importance of curriculum improvements and the ways to do it. The single courses need to be developed as a part of the aims of the whole curriculum. (E01)

(7)

– principle – importance of improvement – how to do it

course need to be dev. to along with curri (2)

task of special people (a)

This could be the task of the educators or of the Dean (for Student Affairs) and dedicated committees. (E02)

level of K & responsibility (3)

the level of knowledge depends on the responsibly - again retrogressive, an increase in understanding is required as responsibly increases. (E03)

staff involving in curr. dev. → important ⇒ if not → fail/difficult to control/introduce/retain important issue (6)

Clearly having the staff involved in curriculum development is important, as we are currently experiencing. Understanding the needs of this dental school is, however, sadly lacking like the other health-science related disciplines. So trying to control the curriculum and introduce/retain dentally important matters is often difficult. (E05)

These suggestions are essential for an educator. (E13)

FT → important   PT → not important (5)

Important for full-time senior educators, not so important for part timers who deliver the curriculum at chairside. (E17)

implement → require management of change (8)

Within the implementation, also management of change needs to be a subject. (E20)

Supachai Chuenjitwongsa – 6th Feb 2013

16

All essential as curricula are constantly evolving. (E33)

depends on roles (4)

Above answers depend on what kind of a teacher you are or want to be. For someone who is developing dental education my answers of 12 a/b/c/ would be essential. (E51)

- teachers focus on their own teaching → not see as a part of curr (1)
- course need to be developed along with curri (2)
- staff need to involve in curri dev. → if not → fail (6)
- level of K & responsibility (3)
- depends on teacher's role (4)
- FT → important (5)
  PT → not so important
- a task for specific group/people (a)
- teach → principle
  → importance of improvement (7)
  → how to improve curriculum
- implement of curri → require management of change (8)

Supachai Chuenjitwongsa – 6th Feb 2013

17

Theme 7

should include all stakeholders [handwritten] *+consider*

Evaluation of the Education Programmes should not be made within the Dental School alone. The views of the community officials, community dentists and other oral health professionals, physicians and patients need to be considered. This type of evaluation is essential, if done only within the Dental School it is not necessary. Teacher evaluation should not be done without the permission of the teacher. The evaluation should focus more on how well the students have fulfilled the aims and objectives of the programme/ topic have than on persons involved in teaching. Evaluation of learning is more important than the evaluation of teaching. (E01)

(9) [handwritten]

teacher [handwritten]
- focus on student achievement rather than personal involvement in teaching
- with permission of teacher
(10)

Same as theme 6. (E02)

task of specific people [handwritten]

This could be the task of the educators or of the Dean (for Student Affairs) and dedicated committees. (E02)   *(8)*

level of K α responsibility (7) [handwritten]

The level of knowledge depends on the responsibility - again retrogressive , an increase in understanding is required as responsibly increases – (E03)

We have a long experience of evaluation by the University, Ministry, external bodies and by students. It has to be admitted that this is always helpful. (E05)

This is strongly pushed in this school and students clearly do benefit. Staff assessments are, on the other hand rather variable, uncontrolled and based on saving money rather than improving quality. (E05)   *(11)*

teacher evaluation [handwritten]
- variable
- uncontrolled

Like assessment for learners, evaluation is essential for teachers and institutions to develop further in their field. (E08)   *(5)* *allow teachers + institutions to develop.*

Supachai Chuenjitwongsa – 6th Feb 2013

18

to answer the health needs (6) [handwritten]

These suggestions are also essential if we want to answer the health needs of the surrounding population (= objectives of our teaching and curriculum) and if we implement a quality assurance process... (E13)

link to QA (1) [handwritten]

link to self-reflection skill (of educators) [handwritten]
A must for all educators, this links with the ability to self-reflect. (E17) *(4)*

This theme should be included in Assessment and Feedback theme. (E19)

link to QA (2) [handwritten]
Evaluation is necessary in the quality cycle. (E20)

Essential as audit and continuous quality improvement is part of the role of a teacher. (E33)   *link to audit, continuous quality improvement* *(3)*

[handwritten summary list]
- link to QA (1,2,3)
- link to self-reflection skills of educators (4)
- allow teachers + institutions to have further dev. (5)
- to answer the health needs (6)
- level of K α responsibility (7)
- task of specific people (8)
- Prog. Eval. → should include + consider all stakeholders (9)
- Teacher Eval → focus on student achievement
     → with permission of teacher } (10)
     Eve → variable
       → uncontrolled } (11)

Supachai Chuenjitwongsa – 6th Feb 2013

19

Theme 8

(1) reality for teaching   should be done by both educators (11) [handwritten]
Research in education gives a reality for teaching. It should be done together with the department of education or/and with department of medicine etc. Research within the Dental School alone has too narrowed a basis for educational research. Teachers need some knowledge on how educational research is done even if they are not interested themselves in doing it. (E01)
RSH mainly DENT (12) *too narrow basis of edu RSH* *need K on how RSH is done (13)*

to know what works. (2) [handwritten]
We need more research on dental education to know what really works! To that end, we need more qualified researchers in dental education. (E13)
(10) need more qualified DENT ED RSHer

PhD staff already aware of RSH (9) [handwritten]
Since dental educators sooner or later have to have a Ph.D. they already must be aware of Research Components and Processes. (E19)

aim to methods to perform RSH [handwritten]
Research of dental education is needed and the methods to perform research require special attention. (E20)   *(14)*

not for dev dent educ but for edu of dent educ (20) [handwritten]
This would not be necessary for developing dental educators, only for developing the educators of dental educators. (E25)

backup L+T (3) [handwritten]
Learning and teaching must be backed up by research in a university environment, otherwise universities will fail in their mission. (E33)

not for most education (21) [handwritten]
Educational research is necessary, but not for most dental educators. (E47)

Supachai Chuenjitwongsa – 6th Feb 2013

Typo [handwritten]
Same comments as earlier. Research should definitely be done with Department of education.... Teachers should be aware or what is going on in the teaching process. (E01-2)
aware of what is going on in T (15)

balance K with responsibility (22) [handwritten]
Educational research knowledge required in balance with the responsibility of the teacher. Knowledge of research processes is essential to understand evidence based teaching and learning. (E02-2)   *(4) RSH process → understand EB T/L*

important for T/L (5) [handwritten]
if educators have no interest in finding the evidence or demanding the establishment of the evidence for educational models, why are they teaching? (E03-2)

I stick to my previous points and my opinion was close to the meaning, except that I think more dental educators should keep up with some areas of research, that includes clinical research and their knowledge should be passed on to the students. (E05-2)
need to keep up-to-date in RSH esp. clin RSH (16) transfer to students
Typo

High education needs research to keep up good results. (E08-2)   *Higher*

not all educators need (23) [handwritten]
Not everyone in dental education needs to be a researcher in the field. A working knowledge of the processes is desirable. (E11-2)

need to be aware of edu RSH → good teacher + EBP (17) [handwritten]
My opinion is that you need to be aware of educational research, methods, components and processes if you want to be a good educator. As for dentistry, to be a good dentist you need to be aware of research and its methodology particularly if you want to apply evidence based practice. (E13-2)

Supachai Chuenjitwongsa – 6th Feb 2013

Supachai Chuenjitwongsa   Appendix L

a topic for further cours 21 (24)

A basic curriculum for teachers of dentistry does not necessarily have to include the research aspects of teaching and learning, they could be a topic for further education. (E16-2)

educator -RSH → require training (25)

Dental educators that are also researchers must undergo such a comprehensive training. Those who are not actively involved in research could have a broad knowledge on the subject instead. (E22-2)

Leducator without RSH → need to know broad K

May be not every respondent interprets these in the same way. I consider what is written as a description of research components and processes as more important than educational research and methods because the last one is more general and does not seem to include that you really understand what is going on. I think it is more important to be able to evaluate educational research and other research and to know about ethical considerations, funding and the mentioned processes, which are also applicable to other types of research, which are important to understand when teaching in dentistry. But others may have thought that you need to know something of educational research methods first. I do not agree on that one. I do agree that you need to know about research methods in general to be able to critically appraise. (E26-2)

(6) understand whats going on
more important on ability to evaluate RSH / critically appraise
RSH mtd/process first
(19) be able to critically appraise be able to do/ edu RSH know

→ to evaluate/measure T mtd. in university (7)

In a university setting teaching methods should also be improved and it should be possible to measure old and new methods. As education in dental school plays such an important role this is also a good chance to do research within duties that have to be done anyway. (E27-2)

↳ a chance to do RSH as a part of duties (7)

I feel that it is advantageous for dental teachers to have undertaken some form of educational teaching programme, which could involve a short research element. (E30-2)

↳ short RSH element (27)

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not for new teacher (26) 22

These components are not necessary for new teachers. (E31-2)

My original views remain unchanged. (E33-2)

Some valid comments on the usefulness of educational research as part of the curriculum. I agree that dentistry does not have enough educational research. (E47-2)

Dent → does not have enough edu RSH (8)

Importance
- reality for teaching (1)
- to know what works (2)
- back up T/L (3)
- to understand EB T/L (4)
- important for T/L (5)
- understand whats going on (6)
- to evaluate/measure/improve T mtd in uni (7)
* ↳ chance to do RSH as a part of duties*
* ↳ link to career dev.*

Recent Problem/Needs
- DENT → not enough edu RSH (8)
[- PhD staff already aware of RSH (9)]
- need more qualified RSHer in DENT ED (10)
- shoud be done by Dpt. of edu. (11)
- RSH in only DENT → too narrow basis of edu RSH (12)

What/How to teach in this topic
- how RSH is done (13)
- method to perform RSH (14)
- whats going on in T (15)
- keep up-to-date in RSH (16)
- aware of edu RSH (17)
- ability to evaluate RSH (18)
- RSH mtd/process → be able to → be able to (19)
* critically appraise do/ know edu RSH*

Consideration
- not for dent educ. but for educ of dent (20)
- not important for most educators (21/23) all
- need to balance level of K vs. roles (22)
- a topic for further course (24)
- edu-RSH → need training edu-non → know broad K (25)
- not for new teachers (26)
- short RSH element (27)

23

Theme 9

need inf. on current trend in edu system :: they may have changed since age studied

(1) Teachers need more information on the current trends in education systems and principles, because they may have changed much since they were students. The information on differences in different countries would also be useful to know.

Dent → global prof. forced to learn diff in diff country

(2) Dentistry is a global profession! Leadership or lack of good leadership is currently one major issue in dentistry. A good leader can handle the situation with different types of people and thus make the best of teamwork. Most teams go wrong because (19) the members are too much alike! Student recruitment and admission principles are related to the issue how much dentistry will open to the society. It would be good to get students from all "walks of life", not only from the upper-class families (rich (30) enough to afford to pay the tuition fees). (E01)

Leadership → some major problem
Admission → how much dent open to society → need student from all grps in society

selection: important for small school + limited facilities (29)

(3) Selecting appropriate students is important in this small school with limited facilities. Meeting international requirements is also essential and current curriculum changes that are underway have called on better management. For this good leadership it is essential and without teamwork we would not achieve our goals. Even I have to accept that, sometimes. (E05)

mgt. → curriculum change + int'l requirement
(28) leadership/teamwork → help achieve goal

not for junior but for senior

(8) Not for junior teachers, maybe senior teachers. (E07)

I just wonder if I am filling in this questionnaire correctly is this for an individual or for a school strategy. (E10)

2nd priority → advance level (at the end) for senior not junior (9)

I think these suggestions are essential too but I would suggest as a second priority. Leadership and management must be taught to senior teachers and not to junior ones (they have already so many things to learn). Are there different levels (steps) in the curriculum you want to build? If yes, I would suggest putting these items at the (11) end. (E13)

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senior FT → a must / chairside PT → overview

A must for senior full time educators, chairside part time teachers should receive an overview. (E17) (21)

to manage UG curriculum (4)

The management of the undergraduate curriculum requires management training. This is something that is not always recognised. (E18)

↳ not always recognised (eve) (5)

for manager/head/education (13)

These items are for those who want to become a manager, or head or education may be. (E20)

for adv. course/CPD (12)

Systems and management, while highly desirable, could be considered for subjects which could be held over for detailed consideration in advanced courses/ part of CPD for trained teachers. (E33)

a-d important; teaching is a profession that cannot be done by clinicians without further training. e student admission: could be left to some people with a dedicated task. (E-2-2)

↳ topic for specific people (28)

small school → all staff have responsibilities → need management principle many

I slightly devalued "e" but as my experience comes from a small school there is no separate managerial class, everyone has to take on responsibility at least in their specialty area, and often in the overall running of the clinical and (6) educational aspects of this dental school. So I think more input into management principles is helpful. (E05-2)

for senior not junior (10)

I maintain my first opinion: these items are essential for senior educators but not for junior ones. (E13-2)

25

p. topic for a small subgroup. (14)

These topics are relevant for only a small group of teachers. (E16-2)

p. teamwork + change → all educators regardless of roles (22)

To be able to work in teams and to manipulate changes in education is a necessary ability that all dental educators should have, regardless whether they occupy administrative and managerial positions or not. (E22-2)

p. not for all teachers but for specific roles (18)

a)& b) Not for every teacher, only for those in specific more leading functions. I do not think it would be feasible to include all subjects mentioned, thus this one should be optional as to my opinion. e) This seems to me an issue for only some of the teachers and managers in the dental school. Not every teacher is or should be involved in student recruitment and admission. Once there in, other things are more important, such as good assessment methods. (E26-2)

admission - for some staff. but not all (27)

p. to follow a logical comprehensive programme (7)

It is important for the undergraduate educational system to follow a logical, comprehensive programme. As dentistry develops it becomes more and more demanding to cover the current topics and to be aware of developments that rapidly become mainstream dentistry. A 5 year undergraduate programme becomes more challenging, what to include, what to omit? (E30-2)

Views remain unchanged. (E33-2)

What do you mean by Educational change? I might want to change a 2 into a 3 or 4....! In general I would say that Educational Management is a theme that is not yet that relevant for a basic training of dental educators, but later for only those educators who will play a role in managing the educational system of their school. (E44-2)

(16) not for basic training but for who have management role (15)

26

understand (princ) of dent ed, → for all esp. FT (17)

I have changed my mind on some of these issues. I think an understanding of dental education is important for most dental educators, particularly those involved full time. I also think that managing the process of educational change is important, because dental education is constantly evolving. (E47-2)

(24) dent ed evolves constantly → need educational change

Student Admission

p. basic building block (25)

Student recruitment is essential - as this is the basic building block - get recruitment wrong and you may have a life-long problem dentist. (E03)

p. basis for the future profession (26)

Student recruitment is the fundamental basis for the future profession - it is undervalued too often. (E03-2)

Leadership

My views are the same otherwise, but leadership and teamwork seem now even more important, therefore 4 instead of 3 (first round). (E01-2)

depends on responsibility/role (23)

Leadership is dependent upon the stage of the individual's responsibility (E11-2)

Why
- *need current trend of edu sys (1)*
- *dentistry → global profession (2)*
- *essential for curr change → international requirement (3)*
- *to manage UG curr (4)*
- *not always recognised (5)*
- *for small school → staff have to involve (6) mgnt roles*
- *to follow a logical comprehensive prog (7)*

What + How to teach this topic
- *not for junior but for senior (8,9,10)*
- *2° priority / adv course / CPD (11,12)*
- *for specific people (14)*
  - *manager/head/edu (13)*
  - *who have managerial roles (15)*
- *not for basic training (16)*
- *for all esp. FT (17)*
- *senior FT → a must / chairside PT → overview (21)*

Mgt / System
- *(12)*
- *(6)*
- *not for all but for specific roles (15)*

Leadership/Tw
- *one major problem in Dent Ed (19)*
- *help to achieve goal (20)*
- *for all educators (22) regardless of roles*
- *depends on responsibility/role (23)*

Change
- *need b/c dent ed evolves constantly (24)*

Admission
- *basic building block (25)*
- *basis for future prof (26)*
- *for some staff not for all (27)*
- *for specific people (28)*
- *important for small school + limited resource (29)*
- *how much dent open to society*
- *need students from all sub-class (3...*

27

Theme 10

built in into curr. (16)   responsibility of all people (17)   not focus on RB (18)

Quality assurance should be built in into the curriculum and the responsibility of all the people in the Dental School. The focus should not be on the regulatory bodies, because they are old-fashioned and controlling organizations. Some local and national guidelines help the work, but the main work should be done within each Dental School. (E01)

main work done in school (19)

See theme 9. (E07)

not for junior / for senior (6)

Not for junior teachers, maybe senior teachers. (E07)

good goal   the goal of all who is involved in edu.

Official quality control would be desirable, but good quality should also be the goal of any individual who is involved in education. (E08) *(1)*

Implementing an assurance quality system in a dental Faculty is now essential. (E13)

for all who practising in HC (7)

A must for all those practising in healthcare today. (E17)

p. to understand why there is the need for evaluation

To understand why you need evaluation and how you can act these subjects are very important. (E20) *(2)*

EU QA model → cause probs to some school

QA is essential but I am concerned that a Europe wide model for education will dilute some of the more advanced and proactive schools. (E30) *(8)*

Why
- *good qual → good for who involve in edu (1)*
- *to understand why evaluation is needed (2)*
- *to give solid base to edu (3)*
- *co-operation? (4)*
- *no QA → quality of teaching is poor (5)*
- *EU QA model → dilute some school (8)*
- *should be aware of → make easier (12) QA process*

What/how
- *not for junior, for senior (6)*
- *for all who practising in HC (7)*
- *be done by those who have K → role specific? (9)*
- *for small school (10)*
- *for individual / optional (11)*
- *...in Germany → need to know ∵ need to take exam from student (13)*
- *not for all (14,15)*

role specific?

p. QA should be done by who has/have K. (9)

In the UK the regulatory bodies' views must be taken onto account. However, if inspections/QA by the regulatory body is undertaken by people without knowledge of the issues covered above in Qs 1-20, then this will encourage the educational organisations to return to the old system of conveying to the developing professionals the views habits and practices of those older than themselves. (E45)

RB → help teachers to adopt QA-actions (20)

Some knowledge about how the regulatory system works could make it easier for teachers to adopt the QA-actions. (E02-2)

essential for small school (10)

In a small school it is ESSENTIAL to be able to demonstrate quality assurance. Otherwise graduates are not rated adequately if, for example, they apply for specialist training. (E03-2)

to give solid base to education

Quality assurance gives the solid base for all our education and makes it comparable with others. (E08-2) *(3)*

understand of QA → co-operation?

If everyone involved in undergraduate educations does not understand what Quality Assurance means then then they will not understand why some systems are in place and require their input and cooperation. (E18-2) *(4)*

not for all, for individual / optional

Not necessary for all dental educations. They could be taught on an individual / optional basis. (E22-2) *(11)*

If QA is always something only the managers want and teachers need to deliver the information the managers need to assess quality, it does not become part of the whole system. Teachers should be aware of these issues, that makes the process of quality assurance much easier. (E26-2)

should be aware of → make easier process (12) QA

QA process
- *built in into the curr (16)*
- *responsibility of all (17)*
- *not focus on RB (18)*
- *teamwork done in school (19)*

RB
- *help to adope QA-action (20)*

→ Germany → need to know → need to take exam from their student

At least in Germany a lot of professionals who teach in university have to take exams from their students. For this they are appointed by regulatory bodies. So it is essential to have profound knowledge about QU and RB. (E27-2)

Views would appear to be supported by many other participants. (E33-2)

Although I disagree with some of the comments made on this topic, I observe that the quality of dental teaching is generally poor. This school has no QA process for teachers. It needs one. (E47-2) *→ no QA → quality of teaching is poor (5)*

Local/Bodies

not for all (14)

Local/ national QA and regulatory body matters need to be understood, but not essential for all teachers. (E33)

Now 3 instead of 2 (first round). Local/National QA are more desirable than controlling organizations. (E01-2)

I change my first opinion and rate desirable instead of essential. I agree with the comments of other colleagues: local/national QA and regulatory body need to be understood but are not essential. The main work should be done within each dental school. (E13-2) *not for all (15)*

It is essential that the workings of regulatory bodies are known and understood if for no other reason than to get their decisions changed! (E28-2)

Supachai Chuenjitwongsa – 6th Feb 2013

Theme 11

→ communication bet. HCS & dent school → improve both parties (1)

The dialogue between the health care System and the Dental School will be essential and improve both parties. (E01)

contribute in
→ clin teacher → investigate+evaluate HCS, quality, mgt

It is essential for the University clinical academics to contribute significantly to investigation and evaluation of our health care system, quality and management. This includes dentists. (E05) (2)

→ not for dent education

These items are for me optional because there are not specific to the dental educator. I think they have to be taught to dental students during their undergraduate (5) curriculum. A junior dental educator must be already aware of all of these items. (E13) *→ is taught in UG → junior already be aware (15)*

for all practising in HC (7)
A must for all those practising in healthcare today. (E17)

→ student need to aware of (9)
Students need to develop within a programme that makes them aware of all aspects of quality in health care. (E18)

why
- *student need to be aware of (9)*
- *dialog HCS&school → improve both parties (1)*
- *clin teach → contribute in investigation+evaluation→ HCS, qual (2)*
- *teachers prepare env. for student (3)*
- *teacher should be able to teach student (4) how/what?*
- *already be taught (5,6)*
- *for all who practising in HC (7,8)*
- *already be familiar (10,11,15)*
- *not for basic sci teacher (12)*
- *small school → even basic sci teacher need to involve (13)*
- *not just essential but fundamental (14)*

not for basic sci teacher (12)
Not necessary for basic science teachers. (E19)

Patient care is very important, but not in this course. (E20)

This is the bottom line. The care of the patients is what it is all about. (E30)

→ already be familiar with these (10)
Trusts insist that teachers are familiar with such matters. (E33)

Supachai Chuenjitwongsa – 6th Feb 2013

→ already be familiar (11)
These will already be familiar to any dental educator. (E47)

→ teacher prepare this for student
Dental Schools are preparing workers for the Health Care Systems (be it private or public) therefore teachers should need the future working environment of the students. Opinion is the same as earlier. (E01-2) (3)

for all who work in HC (8)
Important to everybody who is going to work in a healthcare environment. (E02-2)

small school → all staff (even basic sci) need to contribute to qual of student (HC)
Even basic science teachers should be interested in contributing to the quality of the graduate! I stick to my score as it is relevant to the environment I work in, but probably not in large dental schools. (E05-2) (13)

I maintain my first opinion: this item is not specific to a dental educator curriculum. I agree with all the comments (E13-2)

The Health Care System strongly influences the clinical decisions. It is not that rare that the financial reimbursement contradicts adequate therapy decisions. So educators have to know a lot about this in order to be able to show students ways in which to get official requirements along with good clinical practice. (E27-2)
→ teacher need to know so as to teach student (4)

not essential but fundamental (14)
To me, this is not just essential but fundamental. (E33-2)

→ area of UG/PG not for educator (6)
I suggest that this is an area for undergraduate and postgraduate dental curricula, but is not a necessary component of a dental educator curriculum. (E47-2)

Supachai Chuenjitwongsa – 6th Feb 2013

Theme 12

Very important!! (E07)

→ focus on professionalism, ethics, LLL (2)
Certain knowledge and skills are necessary for safety of the patients but it is very important to focus on professionalism, ethics and attitude for life-long learning to ensure good treatment for every patient thorough the whole career. (E08)

→ in UG level (6)
Except for evidence-based education, my feelings are the same as for theme 11. (E13)

These items are for me optional because there are not specific to the dental educator. I think they have to be taught to dental students during their undergraduate curriculum. A junior dental educator must be already aware of all of these items. (E13)

→ need for professionalism as it has been lost today (1)
As society moves on we need to retain the 'old fashioned' professionalism that appears to have been lost in today's celebrity & self-obsessed generation. All teachers should be professional role models and behave in a professional manner. (E17) (3)
→ be role model + professional manner

→ prof. - vital aspect for UG edu → refer to → teacher teach/role model?
Developing professionalism in undergraduate students is a vital aspect of undergraduate dental education. If dental schools have effective programmes to develop professionalism, even if other aspects of the course are not as well developed, the graduates will be safe learners. (E18)

I think that it is not necessary to make all these different subjects, just professional behaviour as such. (E20)

Supachai Chuenjitwongsa – 6th Feb 2013

33

Clinical and technical skills as well as evidence based practise are skills that the developing educator should have obtained already in his previous training area. (7) (E32)

↳ already in previous training

teacher
↳ need to be competent → for student. → role model? (5)

If teachers are not competent in professionalism, what hope is there for the students! (E33)

↳ already in basic dent ed (8)

Parts of this theme are already in the basic dental education. No need to repeat it in a teacher curriculum. (E42)

My score hit the mean! (E05-2)

I maintain my first opinion and like the precedent item I would say that this item is not specific to a dental educator curriculum. I hope that a junior dental educator has already acquired personal and professional skills when he begins his educator career. (E13-2)

↳ junior already acquired! (9)

↳ need for up-to-date but [how much? / the value? (12)]

It is essential for every "professional" to continually keep up to date. The question is not so much if we should do CPD or even how much CPD we should do, but "How do we assess the value of an individual CPD encounter?" (E30-2)

↳ already a part of UG (10)

34

Evidence-Based

Evidence-based issues are rated lower than others because in EB issues are fashionable and much needs to be learned still of how to make the proper EB-studies. We will see in future how important they really are. It the teacher is too career oriented students may not be very important to her/him! (E01)

EB → trend → fashionable
not sure it is worth yet (18)

Career Skills

↳ teacher aware → guide student

Now 4 instead of 3 (in the earlier round). It is important that teachers themselves are aware of how they themselves have developed in their dental careers and what professionalism means to them as a person. Only after that can they guide students towards professionalism that supports the growth of the personality. (E01-2) (13)

↳ for all (14)

Important for anybody who is supposed to act as a professional. (E02-2)

Prof ↳ already in UG (11)

Professionalism is quite different from Career Skills. Professionalism should permeate all aspects of the undergraduate programme. Many different forms of assessment should be used to monitor and assess professionalism. Career skills are only relevant at the end of the course. (E18-2) *at the end of ed UG* (15)

↳ for new or old who need to re-consider

This subject could be taught every 2-3 years, where new faculties join the school and older would need to re-consider their priorities. (E22-2) (17)

fundamental!

Again, this to me is fundamental. (E33-2)

Appendix M

The final results

(Qualitative data)

Qualitative Analysis of Open-Ended Questions

Summary of the Themes

General Themes (GT): Themes which emerged from data across the whole questionnaire

GT1:   General views toward the educator-curriculum content

Subtheme 1   Scope of the educator-curriculum content

Subtheme 2   Type of the educator-curriculum content

Issue 1   Educational topics which are fundamental

      Issue 2   Educational topics which are optional or advanced topics

GT2:   Personal factors which influences the educator-curriculum content

Subtheme 1   Academic position

Subtheme 2   Teaching experience

Subtheme 3   Roles and responsibilities

Issue 1   Educators who are dental healthcare practitioners

Issue 2   Educators who have a specific role

Issue 3   Educators of a small dental school

GT3:   External factors which influences the educator-curriculum content

Subtheme 1   The nature of undergraduate dental education

Subtheme 2   Local needs and cultures

Topic-Specific Themes (TT): Themes which relate to a specific educational topic

TT1:   Learning Theories and Principles

Subtheme 1   Importance of Learning Theories and Principles

Subtheme 2   Problems of Learning Theories and Principles

Subtheme 3   How to Teach Learning Theories and Principles

Subtheme 4   Considerations for Learning Theories and Principles

TT2:   Modes of Education

TT3:   Large Group Teaching

Subtheme 1   Advantages and Disadvantages of Large Group Teaching

Subtheme 2   How to Teach Large Group Teaching

Subtheme 3   Considerations for Large Group Teaching

TT4:   Small Group Teaching

TT5:   Teaching in the Clinical Setting and One-to-One Teaching

TT6:   Outreach Teaching

Subtheme 1   Importance and Problems of Outreach Teaching

Subtheme 2   Considerations for Outreach Teaching

TT7:   Multi-Professional Teaching

TT8:   Learner's Issues (Support for Learners)

Subtheme 1   Definition of Difference

Subtheme 2   Importance of Learner's Issues (Learning Difficulties)

Subtheme 3   Considerations for Learner's Issues

TT9:   Educational Material and Instructional Design

Subtheme 1   Importance of Educational Materials and Instructional Design

Subtheme 2   How to Teach Educational Materials and Instructional Design

Subtheme 3   Considerations for Educational Materials and Instructional Design

TT10: Assessment and Feedback

Subtheme 1   Importance and Problems of Assessment

Subtheme 2   How to Teach Assessment

Subtheme 3   Considerations for Assessment

Subtheme 4   Self-Assessment and Feedback

TT11: Curriculum

Subtheme 1   How to Teach Curriculum

Subtheme 2   Considerations for curriculum

TT12: Evaluation

Subtheme 1   Importance and Problems of Evaluation

Subtheme 2   How to Teach Evaluation

Subtheme 3   Considerations for Evaluation

TT13: Educational Research

Subtheme 1   Importance of Educational Research

Subtheme 2   Problems of Educational Research

Subtheme 3   How to Teach Educational Research

Subtheme 4   Considerations for Educational Research

TT14: Educational Management

Subtheme 1   Importance and Problems of Educational Management

Subtheme 2   Considerations for Educational Management

Subtheme 3   Leadership

Subtheme 4   Student Admission

TT15: Quality Assurance

Subtheme 1   Importance of Quality Assurance

Subtheme 2   Consideration for Quality Assurance

Subtheme 3   Quality Assurance Processes and Bodies

TT16: Patient Care and Health Care System

Subtheme 1   Importance of Patient Care and Health Care System

Subtheme 2   Consideration for Patient Care and Health Care System

TT17: Professionalism

Subtheme 1   Importance of Professionalism

Subtheme 2   Consideration for Professionalism

Subtheme 3   Career Skills

Details of the Themes

General Theme 1 (GT1): General views toward the educator-curriculum content

Subtheme 1 (GT1-S1): Scope of the educator-curriculum content
Respondents suggested that all educators need to know basic knowledge of all educational topics regardless of their roles and responsibilities. On the other hand, some of participants commented that educators do not have to know all educational topics. They asserted that if their roles relate to the curriculum level, they need to know all topics/content. However, if they just need to develop personal teaching, they do not need to know all topics/content.

"Educators need to know all topics"	"The extent of the knowledge required is progressive – junior lectures need less than senior lectures who need less than professors; but all need an understanding of the basics." (T1/E03/N-Europe) "To be able to work in teams and to manipulate changes in education is a necessary ability that all dental educators should have, regardless whether they occupy administrative and managerial positions or not." (T9/E22-2/S-Europe) "Important for anybody who is supposed to act as a professional." (T12/E02-2/W-Europe)
"Educators do not need to know all topics"	"In teaching the teacher to help to develop a whole curriculum, I think these should all be included. If it is only about teaching the teacher to help to develop his or her own piece of teaching within the dental curriculum, this is my opinion." (T1/E26/W-Europe) "Not everyone in dental education needs to be a researcher in the field." (T8/E11-2/N-Europe)

Subtheme 2 (GT1-S2): Type of the educator-curriculum content
The educator-curriculum content can be classified into three groups which are: 1. Educational topics which are fundamental 2. Educational topics which are optional or advanced topics 3. Educational topics which educators have already been familiar with or have learned from their previous training

Supachai Chuenjitwongsa   Appendix M

Subtheme 2 Issue 1 (GT1-S2-I1): Educational topics which are fundamental

Respondents commented that several educational topics (e.g. educational principles, patient care and health care system and career skills) are fundamental which educators need to know.

"The background philosophical aspects are important, but the approaches and methods to learning are fundamental." (T1/E36/S-Europe)

"To me, this [i.e. patient care and health care system, career skills] is not just essential but fundamental." (T11-12/E33-2/N-Europe)

Subtheme 2 Issue 2 (GT1-S2-I2): Educational topics which are optional or advanced topics

Respondents commented that several educational topics (e.g. learners with special needs, educational research, educational management and quality assurance) should be considered as the second priority when developing a curriculum for educators. They can be provided in an optional or advanced module/course.

"I agree that no one has to be left behind but when you build a curriculum you need to prioritize the items you want to teach otherwise the curriculum might be overloaded. This item [i.e. learners with special needs] is for me desirable but not essential." (T3/E14-2/W-Europe)

"A basic curriculum for teachers of dentistry does not necessarily have to include the research aspects of teaching and learning, they could be a topic for further education." (T8/E16-2/N-Europe)

"Systems and management, while highly desirable, could be considered to be subjects which could be held over for detailed consideration in advanced courses/ part of CPD for trained teachers." (T9/E33/N-Europe)

"Not necessary for all dental educations. They could be taught on an individual/optional basis." (T10/E22-2/S-Europe)

"To me, this [i.e. patient care and health care system, career skills] is not just essential but fundamental." (T11-12/E33-2/N-Europe)

"Evidence-based clinical practice and health care quality and standards should be optional. [They are] not essential for most [educators] who do not cover clinical subjects or who are not clinician." (VE2/N-Europe)

General Theme 2 (GT2): Personal factors which influences the educator-curriculum content

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Subtheme 1 (GT2-S1): Academic position

Respondents suggested that full-time educators need to learn content of all topics while part-time educators need to learn only the specific topics which relate to their main teaching roles. However, educational theories and principles of assessment are topics which clinical educators need to learn and understand. Most of clinical part-time staff are not fully aware of educational theories which inform their teaching. They also lack of knowledge in assessment.

"[Topic of a curriculum is] important for full-time senior educators, not so important for part timers who deliver the curriculum at chairside." (T6/E17/N-Europe)

"I think an understanding of dental education is important for most dental educators, particularly those involved full time." (T9/E47-2/N-Europe)

"Clinical teachers making a career of clinical teaching will need to learn more in the area of education." (T1/E05/N-Europe)

"Chairside clinical teachers a number who are part time require the theory behind education and learning/teaching styles." (T2/E17/N-Europe)

"Chairside part time teachers should receive an overview [of educational management]." (T9/E17/N-Europe)

"My experience tells me that clinicians are not fully aware of these concepts [i.e. educational theories and principles]." (T1/E15/N-Europe)

"Again [assessment is] another must as a number of chairside educators do not appear to grasp this aspect of their role." (T5/E17/N-Europe)

Subtheme 2 (GT2-S2): Teaching Experience

Respondents suggested that the level of knowledge for several educational topics need to be relevant to the teaching experience of educators. Junior educators and clinical educators need to learn basic level of topics while senior educators need to understand in-depth knowledge of the topics. Particular educational topics such as educational research, educational management and quality assurance are for senior educators rather than junior educators.

"The level of knowledge depends on the responsibility - again retrogressive, an increase in understanding is required as responsibly increases." (T1-5-6-7/E03/N-Europe)

"I think senior educators, department heads and so forth need more educational theory but this is not a requirement for ALL the clinical staff…" (T1/E05/N-Europe)

"I maintain my first opinion: these items [i.e. educational management] are essential for senior educators but not for junior ones." (T9/E13-2/W-Europe)

"Junior teachers can concentrate on actual teaching and curriculum planning. The rest can be added at the later stage of their career." (VE14/N-Europe)

"These components [i.e. quality assurance] are not necessary for new teachers." (T8/E31-2/W-Europe)

Subtheme 3 (GT2-S3): Roles and responsibilities

Respondents commented that educators with specific roles and responsibilities need to learn and understand specific educational content which are relevant to their roles. There are four aspects which need to be considered.
 1. Educators who are dental healthcare practitioners
 2. Educators who have a specific role
 3. Educators of a small dental school

Subtheme 3 Issue 1 (GT2-S3-I1): Educators who are dental healthcare practitioners

Respondents suggested that educators who still involve in health care practitioners need to learn the principle of quality assurance, patient care and health care system.

"A must for all those practising in healthcare today." (T10/E17/N-Europe)

"Important to everybody who is going to work in a healthcare environment." (T11/E02-2/W-Europe)

Subtheme 3 Issue 2 (GT2-S3-I2): Educators who have a specific role
Respondents suggested that some educational topics/content such as learners with special needs, curriculum, evaluation and educational management are for educators who have particular roles which involve in these issues. They are role-specific topics rather than general topics for all educators.

"I do not think that every teacher has to be an expert in this [i.e. learners with special needs]. As someone else already stated, a specially trained person could take care of this." (T3/E27-2/W-Europe)

"These topics [i.e. educational management] are relevant for only a small subgroup of teachers." (T9/E20/W-Europe)

"This [i.e. curriculum] could be the task of the educators or of the Dean (for Student Affairs) and dedicated committees." (T6/E02/W-Europe)

"Depend on what kind of a teacher you are or want to be." (T6/E51/W-Europe)

Subtheme 3 Issue 3 (GT2-S3-I3): Educators of a small dental school

Respondents asserted that several educational topics (e.g. student admission, quality assurance, patient care and health care system) are required for educators who work in a small dental school. Because the personnel and resources in a small school are limited, educators in the school need to be able to work in different roles (e.g. teaching, administration) to support the function of the school.

"Selecting appropriate students is important in this small school with limited facilities." (T9/E05/N-Europe)

"In a small school it is ESSENTIAL to be able to demonstrate quality assurance. Otherwise graduates are not rated adequately if, for example, they apply for specialist training." (T10/E03-2/N-Europe)

"Even basic science teachers should be interested in contributing to the quality of the graduate! I stick to my score as it is relevant to the environment I work in, but probably not in large dental schools." (T11/E05-2/N-Europe)

General Theme 3 (GT3): External factors which influences the educator-curriculum content

Subtheme 1 (GT3-S1): The Nature of Undergraduate Dental Education
One participant pointed out that the nature of undergraduate dental education is different from other health professional education. Teaching in clinical dentistry involves micro-surgery level, irreversible procedure and patients.
"Teaching dentistry esp. clinical is totally different to other disciplines (esp. medicine) as we are training students to the level of micro-surgeons and they undertake irreversible procedures on awake, aware patients who are stressed (as going to the dentists is not enjoyable)." (T2/E03/N-Europe)

Subtheme 2 (GT3-S3): Local needs and cultural diversity
Participant raised that important factors which can influence implementation of the educator-curriculum include local needs and cultures, and regional varieties and diversity.
"Needs of the country, areas of priority, and international requirements." (VX8/N-Europe) "The particular cultural environment in which education takes place." (VE19/S-Europe) "Regional varieties and diversity, remote access areas, and issue with remoteness for accessing education and experience." (VX2/N-Europe)

Topic-Specific Theme 1 (TT1): Learning Theories and Principles

Subtheme 1 (TT1-S1): Importance of Learning Theories and Principles	
Respondents asserted that learning theories and principles are important and need to be included in a curriculum for educator as they provide several benefits to both students and educators: ➢ They help students to develop lifelong learning skills; ➢ They allow students to better engage with educators; ➢ They ensure that student will receive the best tuition; ➢ They help educators to develop their personal teaching and facilitating skills; and ➢ They support curriculum development to support student learning Respondents suggested that reflective learning need to be emphasised as it support deep learning and aid teaching.	
Issue 1 Importance	"It is important to prepare the student for life-long learning. This requires knowledge of learning principles." (T1/E02/W-Europe) "[They] helps you [students] to understand and allows you [students] to engage with a tutor and ask questions." (T1/S05-2/N-Europe) "Modern healthcare educators require all of the above to ensure undergraduates receive expert tuition as required by practitioners of the future." (T1/E17/N-Europe) "Educational theories able structural improvement of one's own skills and facilitate discussion around pedagogic issues in the whole unit." (T1/E08/N-Europe) "By understanding better how students learn, the curriculum and educational approach can be adjusted to improve learning." (T1/E18/N-Europe)
Issue 2 Reflective Learning	"I highlight the reflective practice because teaching without the proper communication and dialogue between teacher and student does not lead to deep learning." (T1/E01/N-Europe) "The use of reflective learning is a powerful aid to teaching." (T1/E30/N-Europe)

Subtheme 2 (TT1-S2): Problems of Learning Theories and Principles

Participants pointed out that medical and dental education have been changing continuously; however, educational approaches in dental education have not yet reflected the change. Additionally, up-to-date teaching and the use of technology in teaching are hardly found in dentistry. Therefore, dental education needs to have a sound educational basis.

"Dentistry/medicine will change dramatically within the next 10 years but our approaches to these changes are not reflected in our education. Therefore the education per se has to be very good and needs to have a sound basis." (T1/E29/W-Europe)

"Up to date teaching - using new technology is seldom found." (T1/P6/W-Europe)

Subtheme 3 (TT1-S3): How to Teach Learning Theories and Principles

Participants suggested that, in a curriculum for educator, the topic of learning theories and principles needs to focus several issues:
- ➢ Awareness of contemporary teaching and learning methods;
- ➢ Teaching how to learn;
- ➢ How to develop teaching on a good theoretical basis;
- ➢ How to keep teaching and learning to be in line with assessment;
- ➢ Learning/revision which suit student learning styles;
- ➢ Practicing with having a mentor for learning in dentistry; and
- ➢ Placing students to learn in an authentic and positive environment.

All of these issues need to be evidence-based rather than opinion-based.

"Contemporary Learning Methods vary from time to time, it is good to be aware of them, but they cannot be the only guideline." (T1/E01/N-Europe)

"In the era of evidence based practice, and a world in which disease patterns, patient expectations, and materials and technology are changing almost daily it is much more important to teach people how to learn than to simply fill them with today's facts (50% of which will be proven to be wrong within 10 years)." (T1/E45/N-Europe)

"Each teacher has to develop his/her own personal ways to teach, but he/she needs a good theoretical basis to develop his/her own style." (T1/E01/N-Europe)

"Assessments should match the learning process." (T1/E18/N-Europe)

"Each student needs their revision tailored to themselves and especially in 1st year [that students] may not know how to revise themselves." (T1/S37/N-Europe)

"Practicing and having a mentor is the best way to learn dentistry." (T1/S39/S-Europe)

"It is important for students to be able to work in a reality environment." (T2/S38/N-Europe)

"A positive and happy environment is essential for success." (T1/P5/N-Europe)

Subtheme 4 (TT1-S4): Considerations for Learning Theories and Principles

Respondents provided several issues which need to be considered when developing curriculum content on the topic of learning theories and principles:

- ➢ Roles and responsibilities of educators and the scope of the topic;
- ➢ Roles and responsibilities of educators and level of knowledge of the topic;
- ➢ Needs for clinical educators to learn more about education; and
- ➢ Needs for educators to develop teaching techniques.

"In teaching the teacher to help to develop a whole curriculum, I think these should all be included. If it is only about teaching the teacher to help to develop his or her own piece of teaching within the dental curriculum, this is my opinion." (T1/E26/W-Europe)

"I think senior educators, department heads and so forth need more educational theory but this is not a requirement for ALL the clinical staff" (T1/E05/N-Europe)

"My experience tells me that clinicians are not fully aware of these concepts." (T1/E15/N-Europe)

"Clinical teachers making a career of clinical teaching will need to learn more in the area of education." (T1/E05/N-Europe)

"It's important for educators to continue their professional development and always strive to develop their teaching techniques for the best possible teaching." (T1/S23/N-Europe)

Topic-Specific Theme 2 (TT2): Modes of Education

Respondents suggested that there are several issues which need to be considered when developing curriculum content on the topic of modes of education:
  ➢ Students learn in different ways so they need to be engaged in different modes;
  ➢ Student learning and examination grade can improve if an appropriate mode is used;
  ➢ An application of modes of education is important;
  ➢ Modes of education need to be chosen bases on the level of the topic; and
  ➢ Clinical educators need to understand educational theories of modes of education.

"People learn in different ways so a mixture of all the above is necessary." (T2/E10/N-Europe) "[Learning in an appropriate mode of education] would improve learning and examination grade." (T2/S12-2/N-Europe) "All the modes are as good as its application is carried out: an excellent conference for a large number of students can be better than a poorly developed practical session in a lab with outdated technical material." (T2/E41/S-Europe) "The mode of teaching depends on the level of which the topic needs to be learned." (T2/E01/N-Europe) "Chairside clinical teachers a number who are part time require the theory behind education and learning/teaching styles." (T2/E17/N-Europe)

Topic-Specific Theme 3 (TT3): Large Group Teaching

Subtheme 1 (TT3-S1): Advantages and Disadvantages of Large Group Teaching Respondents asserted that large group teaching is important and provides several benefits over other modes of education: ➢ It is effective for providing an overview of knowledge to a large number of students; ➢ Students can learn about communication skills from large group teaching; and ➢ When the school budget is a crucial issue, large group teaching is still important. On the other hand, some of participants argued that large group teaching provides a number of disadvantages on student learning: ➢ Sometimes it fails because educators have not had training to teach in large group; ➢ It encourages students to develop passive learning; and ➢ In a joint teaching session (i.e. students from different disciplines study the same topic in the same time), some aspects which are important for dental education are ignored.	
Issue 1 Advantages of Large Group Teaching	"I recognize that when the number of students is very high it's the only mode you can use." (T2/E13/W-Europe) "Large group teaching is good to give an overview/outline to large numbers." (T2/E03-2/N-Europe) "We always can learn something about communication skills." (T2/P6/W-Europe) "For me teaching in large groups is still necessary because, at least in Germany dental schools do not have enough financial means to pay enough educators so that large groups may [not] be avoided." (T2/E27-2/W-Europe)
Issue 2 Disadvantages of Large Group Teaching	"I have experienced quite many times that the educators fail to lecture well because they have not had the training in lecturing big groups." (T2/P1/N-Europe) "Large group teaching encourages passive learning and so should not be the main mode of delivery of information." (T2/E18-2/N-Europe) "Large group teaching in this small school implies joint teaching with other disciplines, usually in basic sciences. This has been a bad development as the special needs of dental education are ignored." (T2/E05-2/N-Europe)

Subtheme 2 (TT3-S2): How to Teach Large Group Teaching

Participants suggested that, in a curriculum for educator, the topic of large group teaching needs to focus on several issues:
- ➢ How to make the large group teaching more attractive and be able to gain student's interest;
- ➢ How to make the large group teaching more interactive; and
- ➢ Effective communication for large group teaching

"The methods for making this teaching mode more attractive and efficient could be the subject of the educators' course." (T2/E22-2/S-Europe)

"For this the lecturer should know how to build up good lectures and how to awaken the interest of the students." (T2/E27-2/W-Europe)

"It's more effective if it can be interactive, which is difficult in a large group, but not impossible." (T2/E07-2/W-Europe)

"There is a need for effective communication in large lecture environment." (T2/P2/N-Europe)

Subtheme 3 (TT3-S3): Considerations for Large Group Teaching

Respondents provided several issues which need to be considered when developing curriculum content on the topic of large group teaching:
- ➢ This mode is appropriate for a topic which students need to be familiar with or the nice-to-know level;
- ➢ This mode is appropriate for a session which does not require student interaction;
- ➢ This mode is effective for a short instructional period; and
- ➢ This mode is optional as recent education is changing toward coaching.

"The topics that need only 'to be familiar with it' can be thought in large groups." (T2/E01/N-Europe)

"Large group teaching is desirable for certain theoretical subjects, where no interaction with the students is desired." (T2/E22-2/S-Europe)

"I don't condemn large group teaching. It is okay for short instructional periods, but not for transfer of huge amounts of knowledge." (T2/E29/W-Europe)

"When your concept of education is changing towards coaching this mode of education is optional." (T2/E31-2/W-Europe)

Topic-Specific Theme 4 (TT4): Small Group Teaching

Respondents stated that small group teaching provides better benefits than large group teaching as they support reflective learning. However, small group teaching is relatively more expensive, in the short term. Thus, the use of small group teaching needs to emphasise on the "competence" level of learning.
"Large group teaching can be the only way in some issues, but better learning can be gained in small groups and in dentistry." (T2/E30-2/N-Europe)   "I feel that small group teaching is preferable and results in a more reflective learning process." (T2/E08/N-Europe)   "Small group teaching, including PBL is expensive, at least in the short term." (T2/E05/N-Europe)

Topic-Specific Theme 5 (TT5): Teaching in the Clinical Setting and One-to-One Teaching

Respondents suggested several issues which need to be considered when developing curriculum content on the topic of teaching in the clinical setting and one-to-one teaching: ➢ They need to emphasise on the "competence" level of learning;   ➢ They need to be focused on giving feedback;   ➢ They are appropriate for teaching a complicated clinical procedure;   ➢ They support student learning better than large group teaching;
"One-to-one teaching and clinical teaching are needed on most dental topics in which students need 'competence' level of learning." (T2/E01/N-Europe)   "[Clinical teaching and one-to-one teaching] … should be more focused on giving feedback." (T2/E15/N-Europe)   "[Clinical teaching and one-to-one teaching] … are essential in the complicated clinical procedures." (T2/E08/N-Europe)   "One-to-one contact and clinical contact are essential. A lot more is learnt from these bases rather than a large group" (T2/S37/N-Europe)

Topic-Specific Theme 6 (TT6): Outreach Teaching

Subtheme 1 (TT6-S1): Importance and Problems of Outreach Teaching Respondents asserted that outreach teaching is important for dental education in a number of aspects: ➤ It shows how dental education open to the society and bring dental education back to be a part of a community; and ➤ It support learning in the clinical setting by increasing patient care situation for students. However, there are several problems of outreach teaching which need to be considered when developing a curriculum for educators: ➤ It might encourage students to learn how to cut corners [rather than develop comprehensive learning on a particular topic]; and ➤ It is difficult to monitor the quality of outreach teaching.	
Issue 1 **Importance of Outreach Teaching**	"Outreach teaching is to opportunity for the Dental Schools to open up to the society/community." (T2/E01-2/N-Europe) "Outreach/community … teaching approach is needed, because dentistry has for too long time been separated from the community and other health professionals." (T2/E01/N-Europe) "Outreach teaching is very important to deal with "real world" or high need areas." (VX3/N-Europe) "We need to increase the situations when our students take care of patients whatever the care is (prevention or therapeutic), so outreach are essential for me." (T2/E13/W-Europe)
Issue 2 **Problems of Outreach Teaching**	"Sometimes outreach teaching is helpful and gives experience, sometimes the students learn too well how to cut corners. Quality control of outreach clinical experience is sometimes difficult to monitor, in my experience at least." (T2/E05/N-Europe)

Subtheme 2 (TT6-S2): Considerations for Outreach Teaching

Some educators provided several issues which need to be considered when developing curriculum content on the topic of outreach teaching:
  ➢ It is important to address that this mode requires a well-controlled teaching and learning environment;
  ➢ It need to be highlighted that the successful outreach teaching depends on high participation/involvement of well-trained staff; and
  ➢ This mode is not for the basic dental education training. However, one student raised that there should be more outreach teaching.

"Outreach/community-based/workplace teaching in well controlled environments is desirable. It is not a quick fix solution. It requires well trained teachers similar to those part-time staff who supervise in dental hospital clinics." (T2/E18/N-Europe) "Outreach training is OK if the quality of the training and experience can be guaranteed. So outreach teachers need to be involved with the in house staff. Sometimes this works well, sometimes not. We do not have any community clinics in this country [The Netherland], so the advantages of outreach clinical training are not all that clear." (T2/E02-2/W-Europe) "Community based teaching is nice to show the student other situations, but not essential for basic training." (T2/E05-2/N-Europe) "We should do more outreaching to local schools and centres in the UK." (T2/S06/N-Europe)

Topic-Specific Theme 7 (TT7): Multi-Professional Teaching

Respondents asserted that multi-professional teaching are important for students because (1) several oral/dental problems relate to other health problems and (2) this mode allows dentistry to link and work with other health care professionals. However, the successful multi-professional teaching requires both supportive staff and engagement of students. Therefore, when developing curriculum content on the topic of multi-professional teaching, the issue of successful teaching need to be stressed.	
Issue 1 Importance of Multi-Professional Teaching	"Multi-professional teaching is also essential at this stage. We know now that many oral/dental problems are related to the other health problems." (T2/E01-2/N-Europe) "Multi-professional teaching is essential too because with the number of old people increasing, we are not only oral professionals but general health ones." (T2/E13/W-Europe)
Issue 2 Considerations for Multi-Professional Teaching	"Inter/multi-professional education is desirable in theory but it is very difficult in practice to deliver units of a course that are interdisciplinary. If students do not engage well in interdisciplinary education it will fail. Staff form all the disciplines involved need to be very supportive otherwise it is doomed." (T2/E18/N-Europe)

Topic-Specific Theme 8 (TT8): Learner's Issues (Support for Learners)

Subtheme 1 (TT8-S1): Definition of Difference
 	
One participant raised the issue of "learner difference". The learner difference should be perceived as a value rather than a problem and educators need to find the way to deal with learner difference. There are three different types of students which need to be concerned:
  ➤ One third of students need supports;
  ➤ One third of students receive benefit from supports; and
  ➤ One third of student can manage their own problems.

"Instead of speaking of learners problems I would stress learners' differences. That is the issue we need to stress, and also teachers differences. In the post-postmodern society "the difference" is a value itself and we need to take this into account in teaching and find ways to deal with the difference even if we need to give good education to all of the students. To our experience about one third of students need support, in addition one third would benefit of it and one third can manage on their own easily." (T3/E01/N-Europe)

Subtheme 2 (TT8-S2): Importance of Learner's Issues (Learning Difficulties) Respondents commented that educators need to know how to provide appropriate supports to students who have learning difficulties. Recently, there are more students who are diagnosed with learning difficulties come into universities. These difficulties provide negative consequences for students to be successful in dental education. It is the obligation of educators to provide learning supports to these students. The indirect result of this obligation is that educators will receive positive feedback from students. Additionally, one student raised a concern that there should be support throughout a dental school for a student who has problem.
"More students are coming to universities with diagnosed learning difficulties and these students require a lot of support from staff. Some disabilities are such that they make it very difficult to be successful in the course." (T3/E18/N-Europe) "This is imperative. The world is not made of clones. 'Issues' might include dyslexia, for example or other factors that might actually prevent high achievement in 'conventional' education. It is not appropriate to remove content, of course and all students, with the right support, must be able to complete their education." (T3/E11-2/N-Europe) "We are obliged to help with such problems [i.e. learners' problems and difficulties] and doing so has given us much positive feedback." (T3/E05/N-Europe) "If a student is struggling with something, it is important that there is support in place to help them through dental school." (T3/P5/N-Europe)

Subtheme 3 (TT8-S3): Considerations for Learner's Issues

Respondents provided several issues which need to be considered when developing curriculum content on the topic of learner's issues:
- There are not many learners with special needs (e.g. physical disabilities) in dental education so this topic need not to be considered as the top priority;
- This topic could be provided as an advanced courses;
- This topic is for a specific group of people or specially-trained people.

"… the extent to which 'learners with special needs' should be covered may be limited given that individuals with certain special learning needs may not be best suited to a career in dentistry and as such may not be represented in the typical dental student body." (T3/E34/N-Europe)

"I agree that no one has to be left behind but when you build a curriculum you need to prioritize the items you want to teach otherwise the curriculum might be overloaded. This item is for me desirable but not essential." (T3/E14-2/W-Europe)

"It is not wrong to include this into a basic course for educators, but better to take this as a separate item in an upgrading course thereafter." (T3/E44-2/N-Europe)

"I do not think that every teacher has to be an expert in this. As someone else already stated, a specially trained person could take care of this." (T3/E27-2/W-Europe)

Topic-Specific Theme 9 (TT9): Educational Material and Instructional Design

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Subtheme 1 (TT9-S1): Importance of Educational Materials and Instructional Design

Respondents expressed that educational materials and instructional design are important and need to be included in a curriculum for educator due to several reasons:
- ➤ Good learning resources are necessary for effective self-directed learning;
- ➤ Undergraduate dental education becomes more distance learning; and
- ➤ There is an increasing gap between recent educational resources and needs of educators and students.

"For effective self-directed learning a good access to learning resources is essential." (T4/E01/N-Europe)

"Undergraduate dental education has become more of a distance learning protocol." (T4/E30/N-Europe)

"There is an increasing gap between the amount, and quality, of teaching material available in dentistry, particularly in the pre-clinical subjects and the needs of teachers and students." (T4/E05/N-Europe)

Subtheme 2 (TT9-S2): How to Teach Educational Materials and Instructional Design

Respondents suggested that, in a curriculum for educator, the topic of educational materials and instructional design needs to focus on several issues:
- ➤ Effective use of educational materials and instructional design;
- ➤ Creating a respectful educational environment; and
- ➤ Using of a visual aid.

"Essential given that the effective use of educational materials and instructional design are and will continue to be of increasing importance." (T4/E33/N-Europe)

"In instructional design the respectful atmosphere is more important than the technically and decoratively proper settings." (T4/E01/N-Europe)

"Visual study is successful." (T4/S39/S-Europe)

Subtheme 3 (TT9-S3): Considerations for Educational Materials and Instructional Design Respondents provided several issues which need to be considered when developing curriculum content on the topic of educational materials and instructional design: ➢ The advantages of face-to-face teaching and learning on development of collaborative and reflective learning are still important; and ➢ The professional bodies (e.. ADEE, university) need to involve in improving the issue of educational materials and instructional design.
"Undergraduate dental education has become more of a distance learning protocol, but I don't think we should lose sight of the advantages of students learning together and reflecting on that learning." (T4/E30/N-Europe) "More needs to be done by bodies such as ADEE, Universities, or even the Chief Dental Officers to improve this matter." (T4/E05/N-Europe)

Topic-Specific Theme 10 (TT10): Assessment and Feedback

Subtheme 1 (TT10-S1): Importance and Problems of Assessment Respondents asserted that assessment is important for dental education as good assessment form the basis of and drive learning. Moreover, understand of the assessment calibration and standard can prevent subjectivity and bias in the assessment system. However, one participant reported that many assessments still lack of validity.	
Issue 1 **Importance of Assessment**	"Good assessment forms the basis for good learning." (T5/E08/N-Europe) "Assessment drives learning and so the assessments must be in keeping with the learning approach." (T5/E18/N-Europe) "Any programmes which do not include assessment calibration/standard open the door to subjectivity and therefore bias." (T5/E45/N-Europe)
Issue 2 **Problems of Assessment**	"I only recently understood very clearly how important valid assessment is. I am afraid that many assessments lack sufficient validity." (T5/E44/N-Europe)

Subtheme 2 (TT10-S2): How to Teach Assessment One participant suggested that, in a curriculum for educator, the topic of assessment needs to focus on several issues: ➢ Use of assessment methods and instruments depends on the topic of teaching; ➢ Performance assessment need to be honest, respectful and discrete; and ➢ Educators need to learn the topic of assessment with practical exercises.
"Assessment methods and instruments may vary from topic to topic." (T5/E01/N-Europe) "The performance assessment has to be honest, but respectful and discrete especially in the situation when something went wrong." (T5/E01/N-Europe) "Teachers have plenty to learn in all the aspects of assessment and this part of the education has to be large with practical exercises." (T5/E01/N-Europe)

Subtheme 3 (TT10-S3): Considerations for Assessment

Respondents provided several issues which need to be considered when developing curriculum content on the topic of assessment:

➢ The topic of assessment is important for all educators. However, this topic may not need to be taught at the high level because the level of knowledge of assessment depends on roles and responsibilities of educators;
➢ Clinical educators still lack of knowledge in assessment; and
➢ Assessment calibration should not be standard as it depends on individual educators.

"Assessment principles need to be equal for all [educators]." (T5/E01/N-Europe)

"Assessment principles need to be developed in the curriculum but not at a very high level." (T5/E13/W-Europe)

"The level of knowledge depends on the responsibility - again retrogressive, an increase in understanding is required as responsibly increases." (T5/E03/N-Europe)

"Again [assessment is] another must as a number of chairside educators do not appear to grasp this aspect of their role." (T5/E17/N-Europe)

"Depends on the educator. It should not be standard." (T5/P6/W-Europe)

Subtheme 4 (TT10-S4): Self-Assessment and Feedback

Respondents suggested that, in the topic of assessment, the issues of self-assessment and feedback need to be emphasised. They are important for developing a good professional. They allow students to understand their mistakes, identify learning difficulties, and improve learning. The honest [and constructive] feedback is the basis of effective self-assessment. Moreover, students need [constructive] feedback for their further development.

"Particularly self-assessment and feedback. These two items are essential in "building" a good professional." (T5/E13/W-Europe)

"Students need to understand what they have done wrong to improve on their own work. Without feedback assessments which end in failure for the student are demoralising as they may not understand what they have done wrong." (T5/S37/N-Europe)

"Assessment and feedback are especially important so that teachers and students can improve and identify any difficulties." (T5/S38/N-Europe)

"The development of proper self-assessment needs an honest feed-back." (T5/E01/N-Europe)

"The learner needs to get feedback of his/her work to be able to develop." (T5/E08/N-Europe)

Topic-Specific Theme 11 (TT11): Curriculum

Subtheme 1 (TT11-S1): How to Teach Curriculum

Respondents suggested that, in a curriculum for educator, the topic of curriculum needs to focus on several issues:
- ➤ The principles of curriculum and how to improve the curriculum;
- ➤ Keeping an undergraduate curriculum up-to-date;
- ➤ How to develop a course to be congruent with the curriculum aims; and
- ➤ Change management which support curriculum implementation.

"The principles of the curriculum need to point to teachers, [which are] the importance of curriculum improvements and the ways to do it." (T6/E01/N-Europe)

"Education is changing quickly with new technology e.g. e-lecture and computer programmes, and to keep up with these interactive methods the curriculum should always be revised and kept up-to-date." (T6/S38/N-Europe)

"The single courses need to be developed as a part of the aims of the whole curriculum." (T6/E01/N-Europe)

"Within the implementation, also management of change needs to be a subject." (T6/E20/W-Europe)

Subtheme 2 (TT11-S2): Considerations for curriculum

Respondents provided several issues which need to be considered when developing curriculum content on the topic of curriculum:
- ➤ The topic of curriculum is important for full-time educators but not much important for part-time educators; and
- ➤ The topic of curriculum may not need to be taught at the high level because the level of knowledge of curriculum depends on roles and responsibilities of educators. Thus it could be a topic for a special group of people whose roles primarily involve at the curriculum or administrative level.

"Important for full-time senior educators, not so important for part timers who deliver the curriculum at chairside." (T6/E17/N-Europe)

"The level of knowledge depends on the responsibly - again retrogressive, an increase in understanding is required as responsibly increases." (T6/E03/N-Europe)

"This could be the task of the educators or of the Dean (for Student Affairs) and dedicated committees." (T6/E02/W-Europe)

Topic-Specific Theme 12 (TT12): Evaluation

Subtheme 1 (TT12-S1): Importance and Problems of Evaluation

Respondents raised that evaluation support further development educators and dental education institutions. It can help dental professional to answer dental/oral health needs of the population. Moreover, it closely links to the quality assurance and improvement process. However, in term of teacher evaluation, it is still uncontrolled and has not yet achieved the aim for quality improvement.

Issue 1 Importance of Evaluation	"Like assessment for learners, evaluation is essential for teachers and institutions to develop further in their field." (T7/E08/N-Europe) "These suggestions are also essential if we want to answer the health needs of the surrounding population (i.e. objectives of our teaching and curriculum) and if we implement a quality assurance process." (T7/E13/W-Europe) "Evaluation is necessary in the quality cycle." (T7/E20/W-Europe)
Issue 2 Problems of Evaluation	"This is strongly pushed in this school and students clearly do benefit. Staff assessments are, on the other hand rather variable, uncontrolled and based on saving money rather than improving quality." (T7/E05/N-Europe)

Subtheme 2 (TT12-S2): How to Teach Evaluation

One participant suggested that, in a curriculum for educator, the topic of programme evaluation needs to emphasise on the fact that all stakeholders in dental education need to contribute in the evaluation of an educational programme and the evaluation process should not only be conducted only in a dental school.
For the topic of teacher evaluation, the aim needs to focus on achievement of students [i.e. outcome] rather than personal teaching [i.e. input]. It should be conducted under the permission of individual educators.

"Evaluation of the Education Programmes should not be made within the Dental School alone. The views of the community officials, community dentists and other oral health professionals, physicians and patients need to be considered. This type of evaluation is essential, if done only within the Dental School it is not necessary." (T7/E01/N-Europe)

"Teacher evaluation should not be done without the permission of the teacher. The evaluation should focus more on how well the students have fulfilled the aims and objectives of the programme/topic have than on persons involved in teaching." (T7/E01/N-Europe)

Subtheme 3 (TT12-S3): Considerations for Evaluation

Respondents provided several issues which need to be considered when developing curriculum content on the topic of evaluation:
- ➤ Assessment of [student] learning is more important that evaluation of [educator] teaching.
- ➤ The level of knowledge of the topic of evaluation depends on roles and responsibilities of educators. It could be a topic for a special group of people whose roles primarily involve at the curriculum or administrative level.

"The level of knowledge depends on the responsibility - again retrogressive, an increase in understanding is required as responsibly increases." (T7/E03/N-Europe)

"This could be the task of the educators or of the Dean (for Student Affairs) and dedicated committees." (T7/E02/W-Europe)

"Evaluation of learning is more important than the evaluation of teaching." (T7/E01/N-Europe)

Topic-Specific Theme 13 (TT13): Educational Research

Subtheme 1 (TT13-S1): Importance of Educational Research

Respondents asserted that educational research is important as it provided a number of benefits to dental education:
- ➢ It helps educator to know what is going on in dental education and understand what educational strategies work and are effective; and
- ➢ It helps to understand evidence-based teaching and learning in order to support and improve teaching and learning in a university/dental education.

"We need more research on dental education to know what really works!" (T8/E13/W-Europe)

"Knowledge of research processes is essential to understand evidence based teaching and learning." (T8/E02-2/W-Europe)

"Learning and teaching must be backed up by research in a university environment; otherwise universities will fail in their mission." (T8/E33/N-Europe)

"If educators have no interest in finding the evidence or demanding the establishment of the evidence for educational models, why are they teaching?" (T8/E03-2/N-Europe)

"In a university setting teaching methods should also be improved and it should be possible to measure old and new methods. As education in dental school plays such an important role this is also a good chance to do research within duties that have to be done anyway." (T8/E27-2/W-Europe)

Subtheme 2 (TT13-S2): Problems of Educational Research

Respondents raised that there are several problems in dental education which relate to educational research in dentistry:
- ➢ There are not enough dental education research; thus, more researchers in dental education are needed; and
- ➢ Educational research done in dental school have too narrow scope [i.e. may not be able to apply in different context] so educational research need to be done by department of education and/or department of medicine [i.e. as a part of health professional educational research].

"I agree that dentistry does not have enough educational research." (T8/E47-2/N-Europe)

"To that end, we need more qualified researchers in dental education." (T8/E13/W-Europe)

"Research within the Dental School alone has too narrowed a basis for educational research … It should be done together with the department of education or/and with department of medicine etc." (T8/E01/N-Europe)

Subtheme 3 (TT13-S3): How to Teach Educational Research

Respondents suggested that, in a curriculum for educator, the topic of educational research needs to emphasise on several issues:

➢ How to keep up-to-date and be aware of what is going on in educational research;
➢ Methods of performing educational research and how research is done; and
➢ How to critically appraise and evaluate educational research.

"My opinion is that you need to be aware of educational research, methods, components and processes if you want to be a good educator." (T8/E13-2/W-Europe)

"Teachers should be aware of what is going on in the teaching process." (T8/E01-2/N-Europe)

"Research of dental education is needed and the methods to perform research require special attention." (T8/E20/W-Europe)

"It is more important to be able to evaluate educational research and other research and to know about ethical considerations, funding and the mentioned processes, which are also applicable to other types of research, which are important to understand when teaching in dentistry. But others may have thought that you need to know something of educational research methods first. I do not agree on that one. I do agree that you need to know about research methods in general to be able to critically appraise." (T8/E26-2/W-Europe)

Subtheme 4 (TT13-S4): Considerations for Educational Research
Respondents provided several issues which need to be considered when developing curriculum content on the topic of educational research: ➢ The level of knowledge of the topic of educational research depends on roles and responsibilities of educators. Educators who are still active in research require an appropriate training while educators who are not active in research may need only broad knowledge of educational research; and ➢ It could be provided as an optional or advanced course for a specific group of educators.
"Educational research knowledge required in balance with the responsibility of the teacher." (T8/E02-2/W-Europe) "Not everyone in dental education needs to be a researcher in the field [of education]." (T8/E11-2/N-Europe) "Dental educators that are also researchers must undergo such a comprehensive training. Those who are not actively involved in research could have a broad knowledge on the subject instead." (T8/E22-2/S-Europe) "A basic curriculum for teachers of dentistry does not necessarily have to include the research aspects of teaching and learning, they could be a topic for further education." (T8/E16-2/N-Europe)

Topic-Specific Theme 14 (TT14): Educational Management

Subtheme 1 (TT14-S1): Importance and Problems of Educational Management	
Respondents recognised that educational management is important for dental education for several reasons: ➢ Dentistry is global profession so educational management is a key factor for understanding the current trend of educational system and support a dental curriculum to meet the international requirement; ➢ Dental education has been continuously evolving; educational management particularly change management is needed; and ➢ Understanding educational management can support management of an undergraduate dental curriculum. However, one participant articulated that educational management is not always recognised [by stakeholder in dental education].	
Issue 1 Importance of Management	"Teachers need more information on the current trends in education systems and principles, because they may have changed much since they were students. The information on differences in different countries would also be useful to know." (T9/E01/N-Europe) "Meeting international requirements is also essential and current curriculum changes that are underway have called on better management." (T9/E05/N-Europe) "I also think that managing the process of educational change is important, because dental education is constantly evolving." (T9/E47-2/N-Europe) "The management of the undergraduate curriculum requires management training." (T9/E18/N-Europe)
Issue 2 Problems of Management	"The management of the undergraduate curriculum requires management training. This is something that is not always recognised." (T9/E18/N-Europe)

Subtheme 2 (TT14-S2): Considerations for Educational Management

Respondents provided several issues which need to be considered when developing curriculum content on the topic of educational management:
- ➢ It is a topic for a specific group of educators. It is important for full-time educators; however, part-time educators may require only an overview;
- ➢ This topic is important for senior educators rather than junior educators; and
- ➢ It could be provided as an optional or advanced course for a specific group of educators.

"I think an understanding of dental education is important for most dental educators, particularly those involved full time." (T9/E47-2/N-Europe)

"Chairside part time teachers should receive an overview." (T9/E17/N-Europe)

"I would suggest as a second priority. Leadership and management must be taught to senior teachers and not to junior ones (they have already so many things to learn)." (T9/E13/W-Europe)

"In general I would say that Educational Management is a theme that is not yet that relevant for a basic training of dental educators, but later for only those educators who will play a role in managing the educational system of their school." (T9/E44-2/N-Europe)

Subtheme 3 (TT14-S3): Leadership

Respondents advised that leadership is an important issue, when developing a curriculum for educators, which need to be considered in relation to the educational management. Good leadership can bring dental education to achieve its goal. However, lack of leadership is the recent major issue in dentistry. Dental educators need to develop their leadership skills regardless of their roles. Educators also need to develop students the leadership skills.

"For this good leadership it is essential and without teamwork we would not achieve our goals. Even I have to accept that, sometimes." (T9/E05/N-Europe)

"Leadership or lack of good leadership is currently one major issue in dentistry. A good leader can handle the situation with different types of people and thus make the best of teamwork. Most teams go wrong because the members are too much alike!" (T9/E01/N-Europe)

"To be able to work in teams and to manipulate changes in education is a necessary ability that all dental educators should have, regardless whether they occupy administrative and managerial positions or not." (T9/E22-2/S-Europe)

"To teach students how to lead is important." (T9/S39/S-Europe)

Subtheme 4 (TT14-S4): Student Admission

Respondents suggested that student admission is another important issue when developing a curriculum for educators. Student admission is a basic building block for the future of dental profession. It also relates to how dentistry is open to the society. In a small school which resources are limited selecting appropriate students into undergraduate dental education is an essential issue.

"Student recruitment is essential - as this is the basic building block - get recruitment wrong and you may have a life-long problem dentist." (T9/E03/N-Europe)

"Student recruitment and admission principles are related to the issue how much dentistry will open to the society." (T9/E01/N-Europe)

"Selecting appropriate students is important in this small school with limited facilities." (T9/E05/N-Europe)

Topic-Specific Theme 15 (TT15): Quality Assurance

Subtheme 1 (TT15-S1): Importance of Quality Assurance

Respondents commented that quality assurance is essential to dental education for several reasons:
- ➢ It gives a solid base for education and provides the reason why evaluation of educational programme and teaching is needed; and
- ➢ Quality [of teaching] is a goal for all educators, the quality process can help educators to maintain the high quality of teaching.

"Quality assurance gives the solid base for all our education and makes it comparable with others." (T10/E08-2/N-Europe)

"To understand why you need evaluation and how you can act these subjects are very important." (T10/E20/W-Europe)

"Official quality control would be desirable, but good quality should also be the goal of any individual who is involved in education." (T10/E08/N-Europe)

Subtheme 2 (TT15-S2): Consideration for Quality Assurance

Respondents provided several issues which need to be considered when developing curriculum content on the topic of quality assurance:
- ➢ It is the topic which all educators who work as health care providers need to understand;
- ➢ In a specific country, educators need to learn this topic as a part of regulation processes;
- ➢ This topic is important for senior educators rather than junior educators; and
- ➢ It could be provided as an optional or advanced course for a specific group of educators.

"A must for all those practising in healthcare today." (T10/E17/N-Europe)

"At least in Germany a lot of professionals who teach in university have to take exams from their students. For this they are appointed by regulatory bodies. So it is essential to have profound knowledge quality ..." (T10/E27-2/W-Europe)

"Not for junior teachers, maybe senior teachers." (T10/E07/W-Europe)

"Not necessary for all dental educations. They could be taught on an individual / optional basis." (T10/E22-2/S-Europe)

Subtheme 3 (TT15-S3): Quality Assurance Processes and Bodies
Respondents provided some comments on the issue of quality assurance processes and bodies when develop a curriculum for educators: ➢ Knowledge about regulatory bodies could help educators to adopt QA action; ➢ QA processes need to be a part of a dental curriculum; and ➢ All educators have responsibility on the QA issue.
"Some knowledge about how the regulatory system works could make it easier for teachers to adopt the QA-actions." (T10/E02-2/W-Europe) "Quality assurance should be built in into the curriculum and the responsibility of all the people in the Dental School." (T10/E01/N-Europe)

Topic-Specific Theme 16 (TT16): Patient Care and Health Care System

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Subtheme 1 (TT16-S1): Importance of Patient Care and Health Care System

Respondents commented that the topic of patient care and health care system is essential for dental educators for several reasons:
- ➤ Clinical educators need to contribute in investigating and evaluating health care system [so as to improve the educational quality]; and
- ➤ Students need to be aware of patient care and health care system so educators need to know this topic in order to teach and prepare learning environments to support student's learning.

"It is essential for the University clinical academics to contribute significantly to investigation and evaluation of our health care system, quality and management. This includes dentists." (T11/E05/N-Europe)

"Students need to develop within a programme that makes them aware of all aspects of quality in health care." (T11/E18/N-Europe)

"The Health Care System strongly influences the clinical decisions. It is not that rare that the financial reimbursement contradicts adequate therapy decisions. So educators have to know a lot about this in order to be able to show students ways in which to get official requirements along with good clinical practice." (T11/E27-2/W-Europe)

"Dental Schools are preparing workers for the Health Care Systems (either private or public) therefore teachers should prepare the future working environment of the students." (T11/E01-2/N-Europe)

Subtheme 2 (TT16-S2): Consideration for Patient Care and Health Care System

Respondents provided several issues which need to be considered when developing curriculum content on the topic of patient care and health care system. This topic is fundamental for educators who in a health care environment. In a small school, all educators (including basic sciences educators) need to understand the basic principles of patient care and health care system. However, it needs to be realised that most educators might be already familiar with this topic as it is already taught at undergraduate level.

"Important to everybody who is going to work in a healthcare environment." (T11/E02-2/W-Europe)

"Even basic science teachers should be interested in contributing to the quality of the graduate! I stick to my score as it is relevant to the environment I work in, but probably not in large dental schools." (T11/E05-2/N-Europe)

"These will already be familiar to any dental educator." (T11/E47/N-Europe)

"I think they have to be taught to dental students during their undergraduate curriculum." (T11/E13/W-Europe)

Topic-Specific Theme 17 (TT17): Professionalism

Subtheme 1 (TT17-S1): Importance of Professionalism
Respondents commented that the topic of professionalism is essential for dental educators for several reasons:
➢ Professionalism has been lost today so educators need to be aware and understand this topic in order to guide and be good role models for students to develop their professionalism and professional behaviours; and
➢ Educators need to keep up-to-date of professional issues;
"As society moves on we need to retain the 'old fashioned' professionalism that appears to have been lost in today's celebrity & self-obsessed generation. All teachers should be professional role models and behave in a professional manner." (T12/E17/N-Europe)
"It is important that teachers themselves are aware of how they themselves have developed in their dental careers and what professionalism means to them as a person. Only after that can they guide students towards professionalism that supports the growth of the personality." (T12/E01-2/N-Europe)
"All teachers should be professional role models and behave in a professional manner." (T12/E17/N-Europe)
"If teachers are not competent in professionalism, what hope is there for the students!" (T12/E33/N-Europe)
"The goal should always be to make the students the best at what they are educating themselves to be." (T12/S23/N-Europe)
"It is essential for every "professional" to continually keep up to date [of professional issues]." (T12/E30-2/N-Europe)
"It is important for educators to continue their professional development for the best possible teaching." (T1/S23/N-Europe)

Subtheme 2 (TT17-S2): Consideration for Professionalism

Respondents provided several issues which need to be considered when developing curriculum content on the topic of professionalism:

- ➢ It needs to emphasise on how to teach professionalism to students;
- ➢ The main focuses of this topic should be professionalism, ethics, and attitude for lifelong learning;
- ➢ Most educators might be already familiar with this topic as it is already taught at undergraduate level; and
- ➢ The topic of evidence-based skills needs to be carefully considered as the worth and effectiveness of evidence-based principles has not yet been clear.

"I see little reason to include it in a dental educator curriculum, EXCEPT that we have little idea how to teach in this area. In view of increasing pressure towards developing professional/ethical graduates, this area is in need of special attention." (T12/E47-2/N-Europe)

"Certain knowledge and skills are necessary for safety of the patients but it is very important to focus on professionalism, ethics and attitude for life-long learning to ensure good treatment for every patient thorough the whole career." (T12/E08/N-Europe)

"I think they have to be taught to dental students during their undergraduate curriculum. A junior dental educator must be already aware of all of these items." (T12/E13/W-Europe)

"Evidence-based issues are rated lower than others because … EB issues are fashionable … [it] may not be very important to her/him!" (T12//E01/N-Europe)

Subtheme 3 (TT17-S3): Career Guidance Skills

Respondents provided some comments on the issue of career guidance skills when develop a curriculum for educators:

- ➢ Career guidance skills are fundamental for all educators especially for new educator and senior educators who need to re-consider their priorities;
- ➢ Students require support further beyond the dental school; and
- ➢ This topic is relevant only at the end of the undergraduate dental curriculum.

"Important for anybody who is supposed to act as a professional." (T12/E02-2/W-Europe)

"This subject could be taught every 2-3 years, where new faculties join the school and older would need to re-consider their priorities." (T12/E22-2/S-Europe)

"Support for the future beyond dental school is very important." (T12/P5/N-Europe)

"Career skills are only relevant at the end of the course [i.e. the undergraduate dental curriculum]." (T12/E18-2/N-Europe)

Appendix N

The curriculum document

The Core Curriculum Content

Domain 1: Educational Principles

This domain focuses on educational basis of learning and teaching in undergraduate dental education.

Topic 1.1 Principles of Teaching and Learning	
Educational Content	Recommended Issues
1. Learning Styles and Learning Approaches 2. Learning Resources, Educational Media and Materials 3. Learning Environment 4. Educational Strategies and Processes 5. Evidence-Based Education 6. Contemporary Teaching and Learning Methods 7. Learning Theories 8. Instructional Design	➤ Providing teaching which is congruent with students' learning styles ➤ Helping students to develop appropriate learning approaches ➤ Providing a variety of teaching styles/approaches to support students' different learning styles and approaches ➤ Using educational theories to underpin and maximise teaching ➤ Using educational evidence to inform teaching ➤ Selecting teaching and learning methods which are congruent with a specific culture/context ➤ Using technology to enhance teaching and learning ➤ Preparing and provide learning resources to support learning ➤ Creating and providing positive learning environment within/outside the educational context

Topic 1.2 Principles of Assessment	
Educational Content	**Recommended Issues**
1. Assessment Calibration 2. Assessment Methods and Instruments 3. Assessment Principles	➢ Using assessment calibration to create fair assessment and improve the quality of assessment ➢ Basic principles of assessment (e.g. psychometric theory) ➢ Selecting appropriate and valid methods to measure student learning and achievement ➢ Using formative and summative assessment for helping students develop deep learning. ➢ Importance of feedback and how to provide constructive feedback to support student learning ➢ Selecting assessment methods in relation to learning domains and levels ➢ Opportunities for educators to gain competence in assessment via real teaching and assessment practice

Domain 2: Educational Practice in Dentistry

This domain represents practical aspects of teaching and learning in dentistry focusing on the undergraduate level.

Topic 2.1 Educator Teaching Strategies in Dentistry	
Educational Content	Recommended Issues
1. Teaching in the Clinical Setting 2. Small Group Teaching 3. Mentoring and Coaching 4. Evidence-Based Clinical Practice 5. One-to-One Teaching	➢ Helping students to develop professional competences and other essential skills in the clinical setting ➢ Using small group teaching to encourage students to develop essential skills necessary for their professional career and practice ➢ Understanding when to intervene or give additional support to students ➢ An ability to recover situations caused by poor performance, clinical failure, or other unforeseen circumstances ➢ Understanding evidence-based principles and processes ➢ Sharing experience with students about applying evidence into practice ➢ Guiding and supporting students to develop lifelong learning skills through the evidence-based process ➢ Understanding chairside teaching and using reflection-in-action to support students

Topic 2.2	Student Learning Strategies in Dentistry
Educational Content	**Recommended Issues**
1. Reflective Practice 2. Feedback 3. Performance Assessment 4. Self-Assessment	➢ Understanding and assisting student to use reflective practice to develop learning ➢ Helping students use reflective practice to make sense of tacit knowledge in dentistry ➢ Helping students develop self-assessment skills and positive attitudes toward self-assessment ➢ Providing constructive and culturally-congruent feedback to support student learning ➢ Using immediate feedback to help students understand tacit knowledge ➢ How to recognise and assess student's good/bad performance

Topic 2.3	Learning Support in Dentistry
Educational Content	**Recommended Issues**
1. Learner's Problems and Difficulties 2. Support for Learners	➢ Understanding learners' differences and cultural diversity ➢ Developing and utilising culturally-appropriate educational strategies ➢ How to identify students who need support and providing appropriate support to students

Domain 3: Curriculum, Quality, and Improvement

This domain covers issues related to curriculum, evaluation, and educational quality.

Topic 3.1	Curriculum
Educational Content	Recommended Issues
1. Programme and Course Development 2. Curriculum Development 3. Curriculum Implementation	➢ Principles of outcome-based education, curriculum, curriculum development and implementation ➢ How to arrange the educational process to be congruent with the curriculum ➢ How curriculum inform effective teaching and learning

Topic 3.2 Evaluation, Quality and Standards

Educational Content	Recommended Issues
1. Teacher and Teaching Evaluation 2. Evaluation of Educational Programmes 3. Principles of Audit, Quality, Standards, and QA 4. QA Implementation and Development 5. Healthcare Quality and Standards	➢ Importance, purposes and focuses of evaluation ➢ How to evaluate teaching and student achievement ➢ How to gain involvement from stakeholders toward the evaluation process ➢ Evaluation models and how to use evaluation as a tool for improving quality of teaching and an UG-curriculum ➢ Understanding quality assurance and related issues for developing and improving quality of teaching ➢ How to gain awareness of and positive perception toward quality assurance ➢ Using healthcare standards to inform teaching and maintaining practice quality in clinical teaching

Topic 3.3 Leadership and Teamwork

Educational Content	Recommended Issues
1. Leadership and Teamwork	➢ Leadership skills relating to teaching roles and dental education contexts ➢ How to develop leadership skills in students

Domain 4: Educational Professionalism

This domain concerns the professionalism of educators.

Topic 4.1 Ethics and Professional Characteristics	
Educational Content	Recommended Issues
1. Professional Ethics and Behaviour 2. Professionalism Development 3. Communication and Interpersonal Skills 4. Personal Management Skills 5. Personal and Professional Development	➢ Characteristics and attributes of a good teacher that can effectively support student learning and development ➢ Understanding professional issues relating to education ➢ Being a good role model ➢ How to demonstrate and apply professionalism into the real professional context ➢ Effective communication skills for teaching and helping students learn ➢ How to maintain and improve knowledge and expertise

Topic 4.2 Knowledge and Expertise	
Educational Content	Recommended Issues
1. Content Knowledge and Expertise 2. Clinical and Technical Skills	➢ Using expert knowledge and expertise for informing effective teaching, encouraging students learning, and supporting students to develop thinking skills and professional competent

The Optional Curriculum Content

Domain 5: Educational Principles

This domain describes educational principles for specific contexts.

Topic 5.1	Interprofessional Education
Recommended Issues	➢ Importance and benefits of interprofessional education ➢ Developing and implementing interprofessional education ➢ How to gain awareness of and positive perception toward interprofessional education

Topic 5.2	Outreach Education
Recommended Issues	➢ Importance and benefits of outreach education on students, dental professionals, and the society ➢ How to support students develop professional competences through outreach education ➢ How to improve and maintain educational quality of outreach education

Topic 5.3	Career Guidance Skills
Recommended Issues	➢ Basic knowledge about career and professional development pathways in a local context ➢ How to motivate and support students to achieve professional and career goal

Topic 5.4	Learners with Special Needs
Recommended Issues	➢ Knowledge about the nature of 'learners with special needs' ➢ How to recognise students' concerns/needs and how to refer students to receive appropriate support from the university or specialists

Topic 5.5	Large Group Teaching
Recommended Issues	➢ How to develop and deliver effective large group teaching that encourages active engagement and learning ➢ Cultural factors that influence the quality of large group teaching

Domain 6: Educational Principles

This domain covers the topic of educational research and its application to dental education.

Topic 6.1	Educational Research and Methods
Recommended Issues	➢ Principles of educational research ➢ How to evaluate educational research in order to inform effective teaching and learning in dental education

Topic 6.2	Research Components and Processes
Recommended Issues	➢ Components of educational research ➢ Processes of conducting educational research and how to apply the processes to other types of research

Domain 7: Educational and Healthcare Management

This domain outlines the educational basis of educational and healthcare management.

Topic 7.1 Educational Change and Management	
Educational Content	Recommended Issues
1. Educational Change 2. Educational System and Dental Education 3. Management and Organisation Principles in Dental Education	➢ Basic concepts of change and management that support educational development ➢ Essential management skills relating to the educational change, institution, and dental education

Topic 7.2 Student Admission	
Educational Content	Recommended Issues
1. Student Recruitment and Admission	➢ Importance of student admission toward the whole dental education and the curriculum ➢ How to develop an effective student recruitment and admission process

Topic 7.3 Regulatory Bodies and Healthcare System	
Educational Content	Recommended Issues
1. Local/National QA and Regulatory Bodies 2. Healthcare System and Management	➢ How to gain awareness of and positive perception toward regulatory bodies and healthcare system ➢ How understanding of regulatory bodies and healthcare system provides benefits on teaching and learning ➢ Helping students to understand their future career environments (healthcare system and its environments)
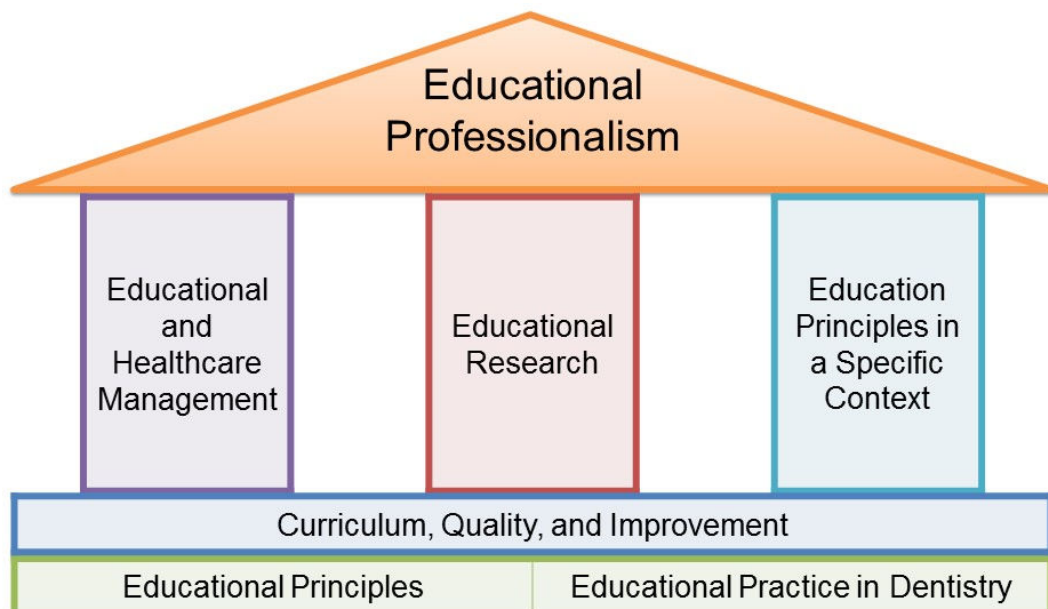
Appendix O

A list of academic presentations

and conferences attended

A List of Academic Presentations and Conferences Attended

Academic Presentations

2014 *"Encouraging International Students to integrate into Welsh Culture at Cardiff University"* – Oral presentation for the Postgraduate Certificate in University Teaching and Learning (PgCUTL) – Brown Bag Seminar, Cardiff University, UK, December 2014.

2014 *"Western Students vs Eastern Students: How do they learn and how do we help them learn?"* – Oral presentation for the Centre for Learning and Academic Development and Learning Spaces (CLADLS), University of Birmingham, UK, October 2014.

2014 *"Agreeing Curriculum Content for Developing Dental Educators in Europe"* – Oral presentation at International Association of Dental Research – Pan European Region (IADR-PER) conference, Dubrovnik, Croatia, September 2014.

2014 *"European Dental Educators: what competences do they want to develop? and what competences do their students want them to develop?"* – Oral presentation at the European Dental Student Association (EDSA) conference, Riga, Latvia, August 2014.

2014 *"Special Issues in Dental Education: : (1) Flipping the lecture, (2) How Asian students learn, (3) Teaching clinical dentistry: A problem with tacit knowledge, (4) RDF, HEA, and Academic staff roles: An example from the UK educational system" – Talk* for academic staff training, Faculty of Dentistry, Chulalongkorn University, Thailand, August 2014.

2014 *"A hoffech chi fod yn addysgwr? Ciwriwcwlwm ar gyfer hyfforddiant addysgwyr / Would you like to be an educator? A curriculum for training educators"* – Oral presentation (in Welsh language) at Blas ar Ymchwil conference, Cardiff University, UK, May 2014.

2014 *"Does culture influence views on lectures and small group teaching? Evidence from a European dental education study."* – Oral presentation at Spotlight on Social Sciences conference, Cardiff University, UK, April 2014.

2013 *"Culture: A hidden factor for effective teaching and learning in dental education" – Oral presentation for the Applied Clinical Research and Public Health Theme Meeting, School of Dentistry, Cardiff University, UK, November 2013.*

(Continued)

2013   *"Active learning: Is it suitable for Asian country/Thai culture?"* – Talk for academic staff training, Faculty of Dentistry, Chulalongkorn University, Thailand, September 2013.

2013   *"Agreeing the content of a curriculum for educators of dental undergraduate students in Europe: A Student Perspective"* – Oral presentation at the European Dental Student Association (EDSA) conference, Birmingham, UK, August 2013.

2013   *"Educators of undergraduate dental students: Roles and competences"* – Oral presentation at International Association of Dental Research – Asia Pacific Region (IADR-APR) conference, Bangkok, Thailand, August 2013.

2013   *"Creating a Curriculum for European Dental Educators of Undergraduate Students"* – Oral presentation at Spotlight on Social Sciences conference, Cardiff University, UK, March 2013.

2013   *"Teaching social science research methods in a Thai university"* – Oral presentation at the Higher Education Academy (HEA) Conference - Innovation in the Assessment of Social Science Research Methods in UK HEIs, Cardiff University, UK, January 2013.
(See http://www.slideshare.net/HEASocSci/teaching-social-science-research-methods-in-a-thai-university-presentation-by-supachai-chuenjitwongsa-cardiff-university for more information).

2012   *"Undergraduate Dental Curriculum Development"* – Talk for academic staff training, Faculty of Dentistry, Chulalongkorn University, Thailand, September 2012.

Conferences Attended

2014   40th Association for Dental Education in Europe (ADEE) Annual Meeting
Riga, Latvia, August 2014.

2013   39th Association for Dental Education in Europe (ADEE) Annual Meeting
Birmingham, UK, August 2013.

2013   24th South East Asia Association for Dental Education (SEAADE) Annual Meeting
Bangkok, Thailand, August 2013.