

This is an Open Access document downloaded from ORCA, Cardiff University's institutional repository: <https://orca.cardiff.ac.uk/id/eprint/103619/>

This is the author's version of a work that was submitted to / accepted for publication.

Citation for final published version:

Chuenjitwongsa, S., Bullock, Alison Deborah and Oliver, R. G. 2018. Roles and competences for educators of undergraduate dental students: a discussion paper. *European Journal of Dental Education* 22 (1) , pp. 47-56. 10.1111/eje.12243

Publishers page: <http://dx.doi.org/10.1111/eje.12243>

Please note:

Changes made as a result of publishing processes such as copy-editing, formatting and page numbers may not be reflected in this version. For the definitive version of this publication, please refer to the published source. You are advised to consult the publisher's version if you wish to cite this paper.

This version is being made available in accordance with publisher policies. See <http://orca.cf.ac.uk/policies.html> for usage policies. Copyright and moral rights for publications made available in ORCA are retained by the copyright holders.



Abstract

Introduction

Dental educators are important people who contribute to the development of every aspect of dental education. In part due to the lack of understanding of their roles and competences, dental educator development has so far received little consideration. With the aim of enhancing the dental profession's contribution to the development of undergraduate dental education, this article explores common roles of educators of undergraduate dental students and the competences needed to be effective educators.

Methods

This is a discussion paper based on a wide reading of the literature on the education of health professionals with a specific focus on roles and competences of educators.

Results and Discussion

Roles of educators of undergraduate dental students typically encompass four areas: teaching, research, administration, and providing healthcare. Educators may not be involved in every role; they normally perform the roles relevant to their work contexts. Competences for dental educators based on the four main roles comprise 12 domains: educational theories and principles; modes of education; learner issues; educational materials and instructional design; assessment and feedback; curriculum matters; evaluation; educational research; educational management; quality assurance; patient care and healthcare system; and professionalism. Not all competences are required by all educators although educators need to be competent in the areas related to their roles and duties.

Conclusion

Understanding the roles and competences for educators of undergraduate dental students can help individual educators to improve their personal effectiveness and institutions to tailor staff development programmes appropriate to the needs of their staff. Faculty development contributes to sustained enhancement of undergraduate dental education.

Introduction

Educators of undergraduate dental students (or dental educators) are valuable people who contribute to the development of every aspect of dental education. They have multiple roles and responsibilities within undergraduate dental education, all of which are important. However, developing dental educators so that they are better able to support the improvement of undergraduate dental education has so far received little consideration.

The first issue that needs consideration is the identification of the roles and competences of dental educators, as they indicate the scope and content of a development plan. There has not yet been a definitive classification of dental educator roles and their roles depend on the context in which they operate. The roles of dental educators are influenced by a number of factors including change and development in education, healthcare systems and needs, research and innovation, requirements for career development, political dictates and institutional requirements (1-4).

The competences of dental educators need to be relevant to the roles which educators perform. Individual educators may not need to be competent in every aspect (5), but they do need to be competent in areas relating to their specific role. This raises a question about whether there are core competencies which are minimum requirements for being an effective educator. Unfortunately, there is limited literature in this area.

This is a commentary paper aiming to outline the common roles of dental educators and identify core competences exhibited by effective educators, through a review and analysis of the literature. The paper attempts to address two main questions: what are the key roles of dental educators in undergraduate dental education and since educators can have different roles, what competences do they need to possess in order to be effective dental educators?

Methods

Although this paper is not a systemic review, a methodical approach to the literature search was adopted. Medical and social science databases were accessed (from 1991 to 2014) to gather relevant articles. The search terms were: *competenc**, *role**, *educator**, and *teach**, with two inclusion criteria. First, selected articles related to health professional education (predominantly medical education and dental education). Secondly, selected articles contained information relating to roles and competences of educators of undergraduate students. Articles not published in

English language and those providing limited discussion of roles and competences were excluded. For this paper, 19 articles fulfilled the criteria and these were subjected to detailed review. From this set of papers, the issues related to roles and competences of educators were identified and categorised thematically (see Table 1 for roles of dental educators and Table 2 for competences).

Roles of Dental Educators

Variety of Roles

Global educational movements have influenced the development of dental professionals. For instance, the adoption of a competency-based approach means that undergraduate dental education should ensure that graduates are competent and able to provide evidence-informed, safe care to service society's needs (6). Institutional issues (e.g. academic policy, finance) and external factors (e.g. national oral healthcare, politics) impinge on undergraduate dental education (7) and dental educators are not unaffected by these factors.

Several studies have delineated the roles of educators. Teaching, research, and clinical practice are the most common roles discussed in the literature (5, 8). As some educators work at the managerial or policy-maker levels, administrative roles have also been identified (9-12). However, roles are not uniform: some educators are not clinicians and do not get involved in clinical teaching/practice; they may have a 'para-clinical' role (e.g. pathologists, ethicists, statisticians). Additionally, practitioners working outside the higher education context (e.g. dentists in an outreach centre) may contribute toward clinical teaching for undergraduate dental students (13) and should consider themselves 'educators' rather than 'supervisors'. Regardless of the context, the literature suggests that an essential element of any dental educator's role is a contribution to teaching or developing students. 'Teaching' seems to be a key role. Research, management, and providing healthcare may be a part of the educator role. Table 1 provides a summary. .

Insert Table 1 here

Educator-Teacher

Dental educators work in a variety of settings including classrooms, laboratories, and outreach/community-based (11, 14, 15) where their teaching roles vary. Even in one teaching context, educators may need to adopt several roles to support students. For instance, in a small group session, educators can be both 'learning facilitators' who support student engagement and discussion within a group, and also 'information providers', offering information which helps students to progress their discussion. Educators' content expertise enhances students' knowledge and helps them to

correct misunderstandings (16). Dental educators in the workplace need to be both experts and have good communication skills (17). Providing students with constructive feedback is a skill that demands effective communication skills (18).

Students can learn how to develop positive relationships with patients by observing educators' approaches in the clinic (19). Students develop professional behaviours and attitudes through role models and via the hidden curriculum. Hence, role modelling (and supervision) is an important part of the 'teaching' role in clinical setting.

A further attribute of the dental educator role concerns evidence-informed dental practice. Evidence-based oral healthcare is needed to improve dental practice quality (4) and dental graduates need to be able to apply evidence to their practice (20). As a result, dental educators should be able to support students in their development of critical appraisal skills and their application of evidence to practice (5, 9).

In summary, teaching roles play out in learning contexts within and outside clinical settings. The role of educators includes providing information, supervising and supporting student learning, and facilitating and helping students develop essential knowledge and competence.

Educator-Researcher

Educators have to apply evidence in practice as well as develop and disseminate new knowledge to their professional society (1, 21). Dental educators in universities engage with research evidence in two related areas: not only do they need to link research literature to the content of their teaching (thus supporting their students' evidence-based practice) but their pedagogy should also be informed by the educational research literature. Evidence-based practice demonstrates the relationship between research, teaching, and practice.

Further, dental educators in universities are usually expected to contribute to the creation of research knowledge, not just its use. Career progression and promotion for university educators is reliant on achievements in research, publications, and grant funding (3); teaching excellence in some countries is increasingly accepted as another indicator for career promotion (22). The amount of research required of a dental educator depends on their career and work context, however dental educators need to balance both teaching and research roles.

Additionally 'Educator-Researchers' need to better recognise that research knowledge can be derived from both quantitative and qualitative research (25). The

process of judging the quality of a qualitative study is not reliant on scientific appraisal (23). This may explain why many professionals with a scientific background (including dentistry) feel reluctant to trust the results of qualitative research. What is important is that the most appropriate methodology for the study is selected.

Educator-Administrator

The administrator 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 (9). Educators who provide clinical practice also manage patients and healthcare systems while educators who are responsible for research are required to manage research projects, processes, and funding (5, 17). Additionally, advances in dental education require systematic processes to assure the quality of education and dental practice (2). Educators have to be involved in the quality assurance system and administrative tasks appropriate to their routines.

In response to the needs for leadership and management in dental education, dental educators are urged to acquire skills essential for supporting change and development in dental education (24-26). However, although the topics of leadership and management have been a fundamental part of an undergraduate curriculum (20, 27), it is not always the case that educators (who are dental practitioners) can fully transfer leadership and management skills to educational contexts. Significant leadership, administration or management roles may be relevant only to experienced, university-based or senior educators.

Educator-Healthcare Provider

Students can learn effectively when they understand how to relate their knowledge to a real problem (28). Understanding the patient care and healthcare system will enable students to develop a better appreciation of their professional responsibilities, hence dental educators need to display knowledge of dental professional and healthcare contexts. Such knowledge is also important for non-clinical educators to enable them to guide students to link what they learn in non-clinical contexts to real world professional environments.

University-based clinical educators need to provide oral healthcare to patients in the dental school/hospital. Sometimes educators need to take a practitioner role even when they are in the teaching context, for example, if an unforeseen serious circumstance should occur (e.g. patient injury caused by a student) clinical educators may need to take charge of the procedure in order to recover the situation. In these circumstances, the role of educators is not only to supervise students, but also to ensure patient safety and provide a vivid lesson on how to manage such a mishap.

Thus the 'healthcare provider' role not only relates to improving societal oral healthcare through dental practice but also student development. Not all dental educators are healthcare providers (e.g. basic sciences educators), hence the role 'healthcare provider' may not be relevant to all educators.

The Relationship between the Main Roles

For many, the four main roles of dental educators are intertwined: teaching, research, administration, and providing healthcare. Some of these roles are relevant to educators across the career contexts (e.g. university-based, community/service-based) and professional background (e.g. clinical, basic-science, IT/library-based). The balance of the four main roles will vary by individual and educators are expected to perform the roles related to the requirements of their work contexts.

Competences for Dental Educators

Variety of Competences

Despite the extensive development of competence within undergraduate dental education since the 1990s (29), competences for (dental) educators is still an on-going debate. For example, various studies and standards reveal that educational competences relating to pedagogy (e.g. educational principles, learning styles, teaching strategies), assessment, and curriculum are fundamental for all educators (5, 11, 30, 31). Such competences allow educators to understand the educational basis of teaching and offers support on 'how to teach' (32). However, the applicability of these studies and standards is limited because the competences of other related roles (e.g. research, management) were not explored and only clinical teaching contexts were highlighted without acknowledging that dental educators can be non-clinicians and may have other roles that influence the teaching role.

Competences relating to other roles of educators including research, management, healthcare, and professionalism have been emphasised in several standards for educators published by different professional bodies (15, 33-39). Molenaar, et al. (40) assert that the educators' roles are similar regardless of the context so educators should be competent in every aspect. However, context and culture greatly influence teaching and learning (14, 41, 42). Practically, educators in different contexts or cultures may require different educational competences in order to perform their roles effectively. By implication, the required competences should be defined by the nature of the role and the context in which the educator works.

Nevertheless, there are common competences found in the literature that any educator, regardless of their roles and context, should possess (Table 2).

Insert Table 2 here

Regarding the common competences for educators presented on Table 2, the first five domains outline competences that relate to the micro-level of education (e.g. educational principles and strategies, student issues, and assessment). The sixth and seventh domains identify competences at the macro level (e.g. educational programme and curriculum matters). 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). An indicative, but not exhaustive, list of competences in each domain is provided in Table 3.

Insert Table 3 here

What Makes Good Dental Educators?

Educator professionalism has been discussed in the literature. Attributes of educator professionalism include dedication to quality of care, honesty, integrity, positive attitude toward students, respect to students, and positive interaction with other colleagues, enthusiasm for teaching and learning, caring and supportive, being good 'role models', and content and process expertise (30, 43, 44). However, the definition of professionalism is debated (45, 46). It can be helpful to see educational professionalism in holistic terms – 'head, hands, and heart' (47) – 'Head: Doing the right thing'. They need to possess skills essential for teaching and supporting student learning – 'Hands: Doing the thing right'. Finally, dental educators need to have the attributes of a teaching professional – 'Heart: The right person do it'. Educational professionalism should not be seen as an isolated collection of professional attributes; rather it needs to be the core of the educator (48).

Conclusion

Dental educators are key people who contribute to the support of undergraduate dental education. They may adopt a variety of roles and responsibilities. However, there is no definitive classification of dental educator roles as their role depends on context and how they contribute within that context. In light of this article, four main roles of dental educators have been identified: teacher, researcher, administrator, and healthcare provider. Professionalism is the core value embedded within and across the roles. In Figure 1 areas of competence for dental educators in relation to these roles are presented.

Insert Figure 1 here

The acquisition of a Bachelor's degree in dentistry, it does not automatically bestow skills in education. Competences related to education must be learned. Additionally, education will not advance if educators rely on techniques that their own teachers used in the past. This ought to be obvious as they will not use similar educational methods to those of yesteryear. Educators need to possess a wide range of educational competences not only at the micro-level of education (e.g. teaching, learning, assessment) but also at the macro-level (e.g. curriculum matters, institution, healthcare system). Effective dental educators also possess the characteristics of education professionalism.

A better understanding of dental educator competences will help individuals identify their own educational development needs and assist institutions to tailor professional development programmes to support their staff. By clarifying competences, the authors hope dental educators will be better able to contribute effectively to change and sustainable development in dental education.

Conflicts of Interest

The authors have no conflicts of interest to declare.

References

1. Heflin MT, Pinheiro S, Kaminetzky Cp and Mcneill D. 'So you want to be a clinician-educator...': Designing a clinician-educator curriculum for internal medicine residents. *Medical Teacher* 2009; 31 (6): e233-e240.
2. Jones ML, Hobson RS, Plasschaert AJ, et al. Quality assurance and benchmarking: An approach for european dental schools. *European Journal of Dental Education* 2007; 11 (3): 137-143.
3. Smesny AL, Williams JS, Brazeau GA, Weber RJ, Matthews HW and Das SK. Barriers to scholarship in dentistry, medicine, nursing, and pharmacy practice faculty. *American Journal of Pharmaceutical Education* 2007; 71 (5).
4. Winning T, Needleman I, Rohlin M, et al. Evidence-based care and the curriculum. *European Journal of Dental Education* 2008; 12 (suppl 1): 48-63.
5. Hand JS. Identification of competencies for effective dental faculty. *Journal of Dental Education* 2006; 70 (9): 937-947.
6. Chambers DW. Competency-based dental education in context. *European Journal of Dental Education* 1998; 2 (1): 8-13.

7. Chuenjitwongsa S, Oliver R and Bullock AD. Competence, competency-based education, and undergraduate dental education: A discussion paper. *European Journal of Dental Education* In press.
8. Scott J. So you want to be an academic? *Dental Update* 2003; 30 (4): 187-193.
9. Bligh J and Brice J. Further insights into the roles of the medical educator: The importance of scholarly management. *Academic Medicine* 2009; 84 (8): 1161-1165.
10. Harris DL, Krause KC, Parish DC and Smith MU. Academic competencies for medical faculty. *Family Medicine* 2007; 39 (5): 343-350.
11. Srinivasan M, Li S-TT, Meyers FJ, et al. "Teaching as a competency": Competencies for medical educators. *Academic Medicine* 2011; 86 (10): 1211-1220.
12. Sherbino J, Frank JR and Snell L. Defining the key roles and competencies of the clinician–educator of the 21st century: A national mixed-methods study. *Academic Medicine* 2014; 89 (5): 783-789.
13. Smith M, Lennon M, Brook A and Robinson P. Perspectives of staff on student outreach placements. *European Journal of Dental Education* 2006; 10 (1): 44-51.
14. Harden RM and Crosby J. Amee guide no 20: The good teacher is more than a lecturer - the twelve roles of the teacher. *Medical Teacher* 2000; 22 (4): 334-347.
15. COPDEND. Copdend standards for dental educators Manchester: The UK Committee of Postgraduate Dental Deans and Directors, 2013.
16. Azer SA. Challenges facing pbl tutors: 12 tips for successful group facilitation. *Medical Teacher* 2005; 27 (8): 676-681.
17. Prideaux D, Alexander H, Bower A, et al. Clinical teaching: Maintaining an educational role for doctors in the new health care environment. *Medical Education* 2000; 34 (10): 820-826.
18. Ramani S and Leinster S. Amee guide no. 34: Teaching in the clinical environment. *Medical Teacher* 2008; 30 (4): 347-364.
19. Fugill M. Tacit knowledge in dental clinical teaching. *European Journal of Dental Education* 2012; 16 (1): 2-5.
20. Cowpe J, Plasschaert A, Harzer W, Vinkka-Puhakka H and Walmsley AD. Profile and competences for the graduating european dentist - update 2009. *European Journal of Dental Education* 2010; 14 (4): 193-202.
21. Straus SE, Richardson WS, Glasziou P and Haynes RB. Evidence-based medicine: How to practice and teach ebm. Philadelphia: Elsevire, 2005.
22. Dearing R. The dearing report: The National Committee of Enquiry into Higher Education, UK, 1997.
23. Guba EG and Lincoln Y. Paradigmatic controversies, contradictions, and emerging confluence. In: Denzin N , Lincoln Y, eds. *Handbook of qualitative research*. CA: Sage Publication, 2000: 163-188.
24. Albino JE. Who will lead dental education in the future? . In: Haden NK , Tedesco LA, eds. *American Association of Dental Schools, 75th Anniversary Summit Conference*. Washington, DC: American Association of Dental Schools, 1999: 14-22.
25. Certosimo F. Leaders or managers: Who will define a new vision for dental education? *Journal of Dental Education* 2010; 74 (5): 459-463.
26. Corbet E, Akinwade J, Duggal R, et al. Staff recruitment, development and global mobility. *European Journal of Dental Education* 2008; 12 (suppl 1): 149-160.

27. Sanz M, Treasure E, Dijk Wv, et al. Profile of the dentist in the oral healthcare team in countries with developed economies. *European Journal of Dental Education* 2008; 12 (suppl 1): 101-110.
28. Jordan A, Carlile O and Stack A. *Approaches to learning: A guide for educators*. Open University Press, 2008.
29. Chambers DW. Toward a competency-based curriculum. *Journal of Dental Education* 1993; 57 (11): 790-793.
30. Hesketh EA, Bagnall G, Buckley EG, et al. A framework for developing excellence as a clinical educator. *Medical Education* 2001; 35 (6): 555-564.
31. Irby DM. What clinical teachers in medicine need to know. *Academic Medicine* 1994; 69 (5): 333-342.
32. McLeod PJ, Steinert Y, Meagher T and McLeod A. The abcs of pedagogy for clinical teachers. *Medical Education* 2003; 37 (7): 638-644.
33. AoME. *A framework for the professional development of postgraduate medical supervisor* Cardiff: The Academy of Medical Educators, 2010.
34. AoME. *Professional standards (2012)* Cardiff: The Academy of Medical Educators, 2011.
35. HEA. *The uk professional standards framework for teaching and supporting learning in higher education* York: The Higher Education Academy, 2011.
36. London Deanery. *Professional development framework for supervisors in the london deanery* London: The London Deanery, 2012.
37. NLN. *Core competencies of nurse educators with task statements* Washington, DC: The National League of Nursing, 2005.
38. SREB. *Nurse educator competencies* Atlanta: The Southern Regional Education Board, 2002.
39. Bullock AD, Firmstone VR and Falcon HC. Developing guidelines for postgraduate dental educators in the uk. *British Dental Journal* 2010; 208 (1): 19-23.
40. Molenaar W, Zanting A, Van Beukelen P, et al. A framework of teaching competencies across the medical education continuum. *Medical Teacher* 2009; 31 (5): 390-396.
41. Hofstede G, Hofstede GJ and Minkov M. *Cultures and organizations: Software of the mind, revised and expanded*. McGraw-Hill, New York, NY, 2010.
42. Chuenjitwongsa S. *Developing educators of european undergraduate dental students: Towards an agreed curriculum* School of Dentistry. Cardiff University, 2015.
43. Elzubeir MA and Rizk DE. Identifying characteristics that students, interns and residents look for in their role models. *Medical Education* 2001; 35 (3): 272-277.
44. Paukert JL and Richards BF. How medical students and residents describe the roles and characteristics of their influential clinical teachers. *Academic Medicine* 2000; 75 (8): 843-845.
45. Bostock S and Baume D. Professions and professionalism in teaching and development. In: Baume D, Popovic C, eds. *Advancing practice in academic development*. Routledge, 2016: 32-50.
46. Seery A. Ethics and professionalism in teaching. *Studies: An Irish Quarterly Review* 2008; 183-192.
47. Easton F. Educating the whole child, "head, heart, and hands": Learning from the waldorf experience. *Theory into Practice* 1997; 36 (2): 87-94.

48. Singh S, Pai DR, Sinha NK, Kaur A, Soe HH and Barua A. Qualities of an effective teacher: What do medical teachers think? BMC Medical Education 2013: 13 (1): 128.

Table 1 Roles of educators represented in the literature.

Literature	Teaching	Research	Administration	Providing Healthcare
Prideaux et al. (2000) (17)	Medical Expert Communicator Collaborator	Scholar	Manager	Healthcare Advocate
Profession (integrated into all roles)				
SREB (2002) ⁽³⁸⁾	Teacher	Scholar	Collaborator	N/A
Scott (2003) ⁽⁸⁾	Teaching	Research	Miscellaneous	Clinical Practice
Hand (2006) ⁽²¹⁾	Teacher Mentor	Scholar/Researcher	Discipline Leader Curriculum Developer Information Manager Committee Member	Clinician
Harris et al. (2007) ⁽¹⁰⁾	Educator	Researcher	Administrator	Clinician
Bligh and Brice (2009) (9)	Teacher	Researcher	Manager	N/A
Sherbino et al. (2014) (12)	Practicing Education Educational Consultant	Education Scholarship	N/A	Clinical Practice

Table 2 Competences for educators identified from the literature.

Literature	1. Educational Theories and Principles	2. Modes of Education	3. Learner's Issues	4. Educational Materials and Instructional Design	5. Assessment and Feedback	6. Curriculum Matters	7. Evaluation	8. Educational Research	9. Educational Management	10. Quality Assurance	11. Patient Care and Healthcare System	12. Educational Professionalism
Irby (1994) ⁽³¹⁾	○	○	○			○					○	○
Harden and Crosby (2000) ⁽¹⁴⁾	○	○		○	○	○	○					
Prideaux et al. (2000) ⁽¹⁷⁾	○	○	○		○			○	○		○	○
Hesketh et al. (2001) ⁽³⁰⁾	○	○		○	○		○	○		○		○
SREB (2002) ⁽³⁸⁾	○	○	○	○	○	○	○	○	○	○		○
McLeod et al. (2003) ⁽³²⁾	○		○		○	○						○
NLN (2005) ⁽³⁷⁾	○	○	○	○	○	○	○	○	○	○		○
Hand (2006) ⁽⁵⁾	○	○		○	○	○	○	○				○
Harris et al. (2007) ⁽¹⁰⁾	○	○			○	○	○	○	○		○	○
Bligh and Brice (2009) ⁽⁹⁾	○	○	○		○	○		○	○			○
Molenaar et al. (2009) ⁽⁴⁰⁾	○	○			○	○	○	○	○	○		
AoME (2010) ⁽³³⁾	○	○	○	○	○	○	○		○		○	○
Bullock et al. (2010) ⁽³⁹⁾	○	○	○	○	○	○	○	○	○	○	○	○
AoME (2011) ⁽³⁴⁾	○	○	○	○	○	○	○	○	○	○		○
HEA (2011) ⁽³⁵⁾	○	○	○	○	○		○			○		○
Srinivasan et al. (2011) ⁽¹¹⁾	○	○	○	○	○	○	○	○	○			○
London Deanery (2012) ⁽³⁶⁾	○	○	○	○	○	○	○		○		○	○
COPDEND (2013) ⁽¹⁵⁾	○	○	○	○	○	○	○	○	○	○	○	○
Sherbino et al. (2014) ⁽¹²⁾	○	○			○	○		○	○			○

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

Table 3 Domains and a List of Competences for Dental Educators (with examples).

Domain	Competence	Examples
1. Educational Theories and Principles	1.1 Learning Theories	<ul style="list-style-type: none"> ▪ 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
	1.2 Learning Styles and Learning Approaches	<ul style="list-style-type: none"> ▪ Learning styles (e.g. Kolb's learning style inventory) ▪ Learning approaches (e.g. surface, strategic and deep learning)
	1.3 Learning Environment	<ul style="list-style-type: none"> ▪ Learning environment in a curriculum (e.g. teaching and learning environment, clinical environment) ▪ Learning environment outside a curriculum (e.g. extracurricular activities) ▪ Physical facilities required for different learning environments
	1.4 Reflective Practice	<ul style="list-style-type: none"> ▪ Principles of reflection ▪ Reflection on practice ▪ Reflection in practice
	1.5 Mentoring and Coaching	<ul style="list-style-type: none"> ▪ Mentoring ▪ Coaching ▪ Counselling
	1.6 Contemporary Teaching and Learning Methods	<ul style="list-style-type: none"> ▪ 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
	1.7 Educational Strategies and Processes	<ul style="list-style-type: none"> ▪ How to select, develop, deliver and modify teaching strategies ▪ How to develop effective teaching ▪ How to create safe learning environment

		<ul style="list-style-type: none"> ▪ 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)
2. Modes of Education	2.1 Large Group Teaching	<ul style="list-style-type: none"> ▪ Large group teaching techniques ▪ Preparing and delivering a lecture
	2.2 Small Group Teaching	<ul style="list-style-type: none"> ▪ Types of group and small group methods ▪ Small group dynamic ▪ Facilitating the group ▪ Intervention in dysfunctional groups ▪ Peer-assisted learning and tutorial groups
	2.3 One-to-One Teaching	<ul style="list-style-type: none"> ▪ Supervision ▪ One-to-one educational support and guidance ▪ Chairside teaching
	2.4 Teaching in the Clinical Setting	<ul style="list-style-type: none"> ▪ 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
	2.5 Outreach/Community Based/Workplace-Based Teaching	<ul style="list-style-type: none"> ▪ 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
	2.6 Inter-/Multi-professional Teaching	<ul style="list-style-type: none"> ▪ 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)
	3. Learner Issues	3.1 Learners' Problems and Difficulties
3.2 Support for Learners		<ul style="list-style-type: none"> ▪ Supporting learner's development ▪ Supporting the failing student (i.e. remediation)
3.3 Learners with Special Needs		<ul style="list-style-type: none"> ▪ Types of learners with special needs ▪ Educational support for learners with special needs

4. Educational Materials and Instructional Design	4.1 Learning Resources, Educational Media and Materials	<ul style="list-style-type: none"> ▪ 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)
	4.2 Instructional Design	<ul style="list-style-type: none"> ▪ Principles of instructional design ▪ Distance learning ▪ Technology-enhanced learning
5. Assessment and Feedback	5.1 Assessment Principles	<ul style="list-style-type: none"> ▪ 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
	5.2 Assessment Methods and Instruments	<ul style="list-style-type: none"> ▪ 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
	5.3 Assessment Calibration	<ul style="list-style-type: none"> ▪ Calibration of instructors ▪ Calibration of assessment
	5.4 Performance Assessment	<ul style="list-style-type: none"> ▪ Outcome-based/Competency-based assessment ▪ Performance assessment ▪ Work-based assessment
	5.5 Self-Assessment	<ul style="list-style-type: none"> ▪ Self-monitoring ▪ Self-assessment
	5.6 Feedback	<ul style="list-style-type: none"> ▪ Assessment and feedback ▪ Giving constructive feedback ▪ Managing the students who have no insight of their performance
6. Curriculum Matters	6.1 Curriculum Development	<ul style="list-style-type: none"> ▪ Curriculum philosophy, goals and structure (e.g. product, process, research) ▪ Problem identification and needs assessment ▪ Curriculum design, planning and organising ▪
	6.2 Curriculum Implementation	<ul style="list-style-type: none"> ▪ Support, resources and barriers for curriculum implementation ▪ Introducing and administering a curriculum ▪ Updating and reviewing a curriculum
	6.3 Programme and Course Development	<ul style="list-style-type: none"> ▪ Programme/Course design, planning and organising ▪ Managing an educational programme/course
7. Evaluation	7.1 Evaluation of Educational Programmes	<ul style="list-style-type: none"> ▪ 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

	7.2 Teacher and Teaching Evaluation	<ul style="list-style-type: none"> ▪ Peer reviews of teaching ▪ Teacher evaluation and support ▪ Evaluation tools to support educators
8. Educational Research	8.1 Educational Research and Methods	<ul style="list-style-type: none"> ▪ General principles of educational research ▪ Qualitative and quantitative methods
	8.2 Research Components and Processes	<ul style="list-style-type: none"> ▪ Research components (e.g. environment, ethics, funding) ▪ Research processes (e.g. developing, designing, implementing, interpreting, publishing) ▪ Evaluating educational research
9. Educational Management	9.1 Educational System and Dental Education	<ul style="list-style-type: none"> ▪ 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
	9.2 Management and Organisation Principles in Dental Education	<ul style="list-style-type: none"> ▪ 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)
	9.3 Leadership and Teamwork	<ul style="list-style-type: none"> ▪ Leadership ▪ Team building and teamwork
	9.4 Educational Change	<ul style="list-style-type: none"> ▪ Development and implementation of organisational change ▪ Change and development of dental education
	9.5 Recruitment and selection processes	<ul style="list-style-type: none"> ▪ Student selection methods (e.g. multiple mini interviews) ▪ Selection criteria
10. Quality Assurance	10.1 Principles of Audit, Quality, Standards and QA	<ul style="list-style-type: none"> ▪ Terminology which relates to quality matters ▪ Principles of audit, educational quality and standards
	10.2 Local/National QA and Regulatory Bodies	<ul style="list-style-type: none"> ▪ Local/National/International QA ▪ Educational standards/governance ▪ Statutory/regulatory bodies

	10.3QA Implementation and Development	<ul style="list-style-type: none"> ▪ Developing and implementing QA system for dental education
11. Patient Care and Healthcare System	11.1Healthcare System and Management	<ul style="list-style-type: none"> ▪ Healthcare system and function ▪ Evidence-based oral healthcare and practice ▪ Sensitivity to local health needs ▪ Cultural perspectives in medicine/health and barriers to healthcare ▪ Financing healthcare ▪ Poor patient care and improvement
	11.2Healthcare Quality and Standards	<ul style="list-style-type: none"> ▪ Healthcare and service quality ▪ Clinical standards, protocols, policy and governance ▪ Local/National standards and guidance
12. Professionalism	12.1Professional Ethics and Behaviour	<ul style="list-style-type: none"> ▪ 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)
	12.2Professionalism Development	<ul style="list-style-type: none"> ▪ Developing professionalism in dental education ▪ Commitment and advocate to dental education
	12.3Content Knowledge and Expertise	<ul style="list-style-type: none"> ▪ Knowledge and skills of discipline
	12.4Clinical and Technical Skills	<ul style="list-style-type: none"> ▪ Clinical examination skills ▪ Clinical and technical skills
	12.5Evidence-Based Practice	<ul style="list-style-type: none"> ▪ Evidence-based medicine and dentistry ▪ Evidence-based skills (e.g. critical appraisal, application of evidence)
	12.6Evidence-Based Education	<ul style="list-style-type: none"> ▪ Using evidence to support and develop education
	12.7Communication and Interpersonal Skills	<ul style="list-style-type: none"> ▪ Communication and presentation skills ▪ Working with different people ▪ Response to evaluation/criticism ▪ Problem solving and creative thinking ▪ Conflict resolving and negotiation
	12.8Personal Management Skills	<ul style="list-style-type: none"> ▪ Time and task management ▪ Organising of meeting
	12.9Career Skills	<ul style="list-style-type: none"> ▪ Career planning and development ▪ Balance roles and workload
	12.10 Personal and Professional Development	<ul style="list-style-type: none"> ▪ Updating teaching and learning techniques ▪ Developing personal and professional skills ▪ Agencies and sources of information for personal and professional development ▪ Undertaking continuing professional development

Figure 1 Roles and competences for dental educators.

