Occupational Therapy Students' Perceptions of Knowledge and Problem-based Learning

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Abstract

Problem-based learning requires students to work in small groups with a tutor, on a problem scenario that needs to be solved. Previous research has explored students' experiences of problem-based learning in relation to students' learning styles, however, differences in how students perceive knowledge has received little attention. Drawing on the theories of Basil Bernstein, this study explored occupational therapy students' perceptions of knowledge. Twenty students were sampled on the basis of their having followed two, different, educational pathways into a problem-based course; the traditional A level route or through qualifications in healthcare. Interviews were used to gather students' perceptions of occupational therapy knowledge and the findings show that in the first year of the problem-based course the students' views on knowledge differed according to their respective educational pathway. Different interpretations of knowledge have consequences in how students engage with problem-based learning and how they approach assessment tasks.

Introduction

Problem-based learning (PBL) is an elusive concept that has been used to describe heterogeneous educational practice [1]. There is no single definition of what constitutes PBL but its main focus rests on the idea that the starting point of students' learning should be a 'problem' or a 'puzzle' that needs to be solved [2,3]. PBL is underpinned by andragogical learning theory [4] that asserts adults learn best when they take responsibility for their own learning. PBL is also influenced by constructivist approaches to learning that stresses the context bound nature of knowledge and the personal meanings that individuals generate from learning experiences. That is, knowledge is viewed as, not as something that is given to others through a process of replication; transferred from one mind to another, it is created from within individuals through their interrelation with the world [5].

PBL began in the McMaster Medical School in Canada in 1965 at a time, which heralded a significant growth in technology and correspondingly an increasingly congested medical curriculum [6]. Barrows and Tamblyn (medical practitioners) founded the McMaster School in response to this information overload and their growing dissatisfaction with students' difficulties with applying medical knowledge in the clinical setting. The information explosion witnessed by Barrows and Tamblyn in their view, served only to widen the chasm between knowledge content and its application, since the method (lectures) used to teach medical students encouraged compartmentalisation. Concerned also with the obsolescent nature of medical knowledge *per se*, Barrows and Tamblyn regarded the critical application of knowledge as the key weapon in the modern medical practitioners' armoury [6]. This led to the development of a medical curriculum that disregarded the orthodox model comprising a foundation in medical and biological sciences followed by clinical experience in the practice setting. Instead, the McMaster model introduced PBL where students through the use of 'real life' case scenarios were expected to integrate knowledge from the beginning of their studies. To meet this objective however, required a different method of delivering the medical curriculum. Accordingly, the use of small groups (around eight to ten people) working co-operatively to address pre-set problems became the cornerstone of PBL. In practice, this meant that the use of PBL consisted of a number of key stages which have come to characterise how PBL is utilised not only in the McMaster School, but across other PBL programmes e.g. in health professional courses, law and engineering degrees ever since. These stages, or key features of PBL include:

- The presentation of a problem to a small group of students without prior knowledge of that problem.
- Initial group discussion of the problem facilitated by a course tutor (but not necessarily a subject specialist) to clarify the problem and identify possible solutions.
- Identification through group discussion of the gaps in knowledge needed to tackle the problem.
- Establish the learning needs of the group in respect of the problem.

- Collection and exploration of newly acquired knowledge necessary to address students' learning.
- Application of new knowledge to the problem, leading to problem resolution.

These key features of PBL do more than offer an arena in which students are encouraged to contextualise knowledge; they also allude to a different role for the PBL course tutor. In PBL, often the tutor is required to withhold their expertise, as their role is to facilitate students' learning rather than provide students with knowledge content. Since its inception, PBL has grown in popularity, particularly, but not exclusively, for vocationally orientated courses like occupational therapy. Margetson [7] equates the growth of PBL with the broad economic and social changes that require individuals to cope with a more complex world. Arguably, PBL courses equip students with the 'self-directed', 'life long' learning skills that are central to new, 'knowledge-based' economies.
Empirical studies of the experiences of PBL has tended to do so from the perspectives of students [8, 9] teaching staff [10] or a combination of both [11,12]. Most of these studies emphasise the positive benefits of PBL, including the increased motivation on the part of the learner or the 'teacher'. Such an emphasis has led some to suggest that studies of the PBL experience are in danger of being almost 'evangelical' and tend to be less concerned with the potential drawbacks of studying on a PBL course [13]. However, some research [14, 15] has identified the difficulties experienced by both staff and students, particularly when adapting to the practice of PBL.
Research into the students' experience of PBL has tended to concentrate on students' approaches to learning and learning styles. Newble and Enwistle [16] found medical students on PBL courses were more likely to adopt deep rather than surface approaches to learning. Deep learning is characterised by a desire to seek meanings and relate concepts together, whereas surface learning encapsulates the notion of learning to memorise in order to complete task requirements. Similar findings to Newble and Enwistle [16] research were found with students on problem-based occupational therapy, physiotherapy and nursing courses [17, 18,19].
Research on PBL students' understanding of knowledge is limited, but Savin-Baden's longitudinal study [20] did consider students' views of knowledge as part of their overall identity as learners. The findings revealed that students encountered what Savin-Baden termed "dimensions of learner experience" [20, p.56] which required PBL students to make transitions within their sense of who they are as people and crucially who they are as learners. Students often experienced feelings of disjunction or fragmentation on PBL courses when faced with for example, forms of learning that seemed alien to more familiar learning methods. Savin-Baden argues further that dysjunction can occur in one or more of three domains that characterise the students' experiences of learning. That is, within their personal stance e.g. how they view knowledge, within their pedagogical stance e.g. their approaches to learning and their interactive stance e.g. how they relate to others within the learning situation. PBL students cope with disjunction either through acknowledgement or engagement in a new learning process or through avoidance and retreat by for example, adopting learning strategies that have worked for them in the past.
The strength of this study is that it examines students learning in context, taking account of students' multiple identities and how such identities are formed by their previous experiences of learning. Thus Savin-Baden's exegesis of PBL reflects the complexity of the student experience and is devoid of any sweeping generalities about learning through PBL. However, the limitation of this research and similar studies of students' experiences of PBL is that their point of reference is anchored firmly in the experiences of the individual actor (s). Research of this kind, is underscored by a broad constructivist ontology that pays considerable attention to how students develop and build personal meanings. Consequently, this type of research centres on how the individual relates to the environment of PBL, rather than on an exploration of how the relations *within* the learning environment shape the individual's experience and their view of knowledge. Therefore, in this article I focus on a research project that explored how the learning environment itself and the elements within it (e.g. the pedagogy, and the curricula framework) influenced students' views on knowledge.

Methodology

Research Aim and Research Questions:

The overall aim of the research was to investigate occupational therapy students' on a PBL course views on the knowledge that they need for occupational therapy practice. This was examined through the following research questions:

- How do students on a PBL course determine what knowledge is important for occupational therapy practice? Who or what influences this decision?
- Do occupational therapy students prioritise 'types' of knowledge as a consequence of different educational backgrounds?

Theoretical Framework:

To make sense of whether the type and form of pedagogy influenced the students' perception of knowledge, the

research drew on the theoretical insights of the sociologist of education, Basil Bernstein. In particular, the research utilised Bernstein's [21] concepts of 'classification', 'recognition rules', 'framing', 'realisation rules', horizontal' and 'vertical' 'discourse. The concept of 'classification' can be employed to examine the principles that differentiate the contents of educational curricula. Classification is used to examine the boundaries between curricula contents such as the subjects taught to students in school or university. For Bernstein, where the boundary between the contents of a curriculum is clearly defined e.g. where history is differentiated from geography then this typifies 'strong classification'. Here the rule is "things must be kept apart" [21, p.11]. On the other hand, where curricula are 'weakly classified' and the insulation between subjects is not clearly defined, e.g. topics such as 'movement studies' then the rule is "things must be brought together" [21, p.11]. Recognition rules allow students to understand what is legitimate in respect of the types of knowledge that can be brought together in an educational context. Students derive inferences about the relevancy of meanings from their everyday pedagogic interactions by discerning the strength of the boundaries between subject areas [22]. Where classification is strong, it is easier for students to recognise what the pedagogy demands.

Whereas classification characterises the curriculum, the metaphoric structuring of space between subjects, Bernstein uses the term 'framing' to make sense of transmission of pedagogic practice. Framing is the principle through which the message of the curriculum is delivered. It refers to the control over how the meanings are communicated in the educational encounter and the relationships between students and teachers. Just as classification of the curriculum can be seen in terms of being relatively strong or weak, the same analysis can be applied to the concept of framing. Where framing is strong, the teacher has explicit control over the selection, the sequencing and pacing of knowledge that is given to the student. Where framing is weak, there is greater freedom over how the message of the curriculum is delivered and the student has more control over the educational interaction. Realisation rules are derived from the framing principle because students acquire realisation rules by knowing how to put meanings together and make them public, e.g. how to construct the assessments associated with an academic course.

In order to differentiate between types of knowledge we can turn to Bernstein's notions of 'horizontal' and 'vertical' discourse. Horizontal discourse can be seen as everyday, common sense knowledge that is available to all and arises out of a common history of understanding. Horizontal discourse is likely to comprise oral, tacit knowledge that is highly dependent on the social context. In contrast, vertical discourse refers to scholarly, esoteric knowledge and its meaning can be applied across different contexts.

The research setting:

The research was carried out in a School of Occupational Therapy Education. In the United Kingdom (UK), occupational therapists work largely in the area of health and social care. Their interest lies in how 'occupations' and activities can be used therapeutically to reduce the effect of illness or disability on an individual's independence and/or to maintain a person's sense of health and wellbeing. In the UK, to become occupational therapists, students study for an undergraduate (three-year course) degree or a post-graduate qualification (two years) in occupational therapy. All occupational therapy courses require students to acquire a mixture of academic studies and practical (fieldwork) experience. In the School of Occupational Therapy Education, the three-year degree course is fully problem-based and the students' academic content is delivered through a series of case studies (facilitated by a tutor) from which they apply knowledge to occupational therapy practice. Whilst students are expected to draw their academic knowledge from different intellectual fields, such as anatomy, sociology, psychology, these subjects are not taught separately, and thus, according to Bernstein's framework, the problem-based learning course can be categorised as 'weakly classified' and 'weakly framed'. In order to pass the course, students at the School of Occupational Therapy Education are required to complete both written assessments and oral (viva) examinations. For the oral (viva) examination, the students are expected to present an occupational therapy treatment plan for an individual from case studies that they receive a few weeks prior to the examination.

The research procedure:

The research participants were selected on the basis of their having followed two, different educational pathways into the School's three year, problem-based occupational therapy course. The research was approved by a university ethics committee, all participants volunteered to participate in the study and it was made clear to them that pseudonyms would be used to help protect their identity. In total, twenty students took part in the study out of forty-three students who expressed an interest in the research. Ten students were grouped according to whether they had previously studied for advanced qualifications (A level) in different subjects, such as, biology, geography etc. It was anticipated that these students would have experienced a relatively 'strongly classified' and 'strongly framed' form of pedagogy, an archetypal model which Bernstein [21] refers to as the 'collection code'. The ten other students had previously studied for qualifications in healthcare and were likely to have received a relatively 'weakly classified', 'weakly framed' pedagogy that Bernstein refers to as the 'integrated code'. Since the aim of the research was to understand students' views of knowledge, semi-structured interviews were used to collect the data. Each

student was interviewed on one occasion for a period of between one and one and half hours and all the interviews were recorded using a digital dictaphone. Bernstein's theories were used heuristically to make sense of the findings and data were analysed through abductive reasoning. This process differs to deductive theorising where research is driven by a theory itself and inductive approaches that aim to create theory(s) through inspecting different forms of phenomena [24]. Abductive reasoning starts with the particular, from which conceptual ideas are developed, refined and then broadened out to theory. The detailed analysis of each interview transcript led to data reduction and data complication [25]. To reduce the data, descriptive 'tags' were attached to each transcript in order to summarise segments of data, or sections of each interview transaction. Second level coding involved generating super-ordinate categories that linked data together to form new conceptual ideas. The concepts produced from each transcript were then displayed visually to compare and contrast the findings between individuals and groups of individuals. The final stage of analysis led to data verification [25] and this involved drawing conclusions from the findings and developing themes from the data that were then linked with theory. The credibilityand trustworthiness of the findings was addressed through the use of primary data, i.e. the interview excerpts used to support and illustrate my interpretations.

Findings and Discussion

The findings are presented under three broad areas, i.e. the students' perceptions of knowledge prior to starting the PBL course, knowledge recognition and students' experience of group work and knowledge and assessment on the PBL course. All the findings relate to the students' experiences in the first year of the PBL course.

Students' Views on Knowledge Prior to Starting the PBL Programme:

Qualifications in areas such as 'healthcare' are designed to blur the boundaries between disciplinary knowledge and this typifies the 'weakly classified' integrated code. Here the, mixing of subjects requires students to acknowledge the legitimacy of this integration. Kate explains how the structure of her healthcare course influenced her perception of knowledge. Reflecting on her experiences, she saw the healthcare course as a good primer for the PBL course as it required her to draw on a diverse range of knowledge sources:

> *On the health course we would look at things like health promotion and the importance of like, looking after your health. We would use case studies, almost like we do here but without the occupational part of it. For instance, you might have a woman with diabetes. So you would look at the causes of diabetes and look at the woman's lifestyle, the sugar levels, her eating habits and stuff.* (Kate, Healthcare student)

The use of case studies is designed to encourage the students from the healthcare pathway to select knowledge from different disciplines or intellectual fields, while at the same time requiring them to dismantle the boundaries between previously insulated subjects in favour of a 'relational idea' [21]. That is, integrated forms of learning attack the purity of subject categories [26]. Also, (as illustrated in Louise's comments below), the integration of knowledge on healthcare courses is not simply restricted to vertical discourse. Vertical knowledge discourse is used interchangeably with what Titchen and Higgs [27, p.220] refer to as "professional craft knowledge" and the everyday, context dependent, horizontal discourse of the practice setting; in this case, the nursery school:

> *The health and social care course involved working in groups, we used case studies where we would have to go out into the community and visit like nursery schools and see what people did in that setting. You could talk to them…and it would help you with the case study by visualising and applying what people did*. (Louise, Healthcare student)

In contrast to the healthcare students, the students from the A level pathway tended to have a fixed view of knowledge, for them knowledge could be clearly demarcated between subject areas, and this is characteristic of the collection code. A levels were not just separated by discipline but were ordered and structured in a modular framework that the students found appealing:

> Interviewer: *Can we just talk about how your A levels were structured.*
> Bronwyn: *They were split into modules which is something that I liked about it actually, because you had a structure and you knew what you were going to be doing throughout the year. It was well organised, but you were spoon fed the information by the teacher.*

In discussing how her A levels were structured, Bronwyn also alludes to the means through which she accessed/acquired knowledge. The use of the term "spoon fed" points to the nature of the relationship between the A level student and the teacher. Here the teacher is seen as the 'provider' of knowledge and the student is the passive recipient. The clearly defined roles of the 'teacher' and the 'student' is representative of strong framing where the "transmitter has explicit control over the selection, sequence and pacing" of the knowledge base [21 p.13].

Knowledge Recognition and PBL Group work:

Group work is central to the pedagogy of PBL. Group work provides the forum through which students share and

discuss knowledge that they consider is necessary in order to address a given problem. When first engaging with PBL, the students' previous experiences of education influenced the forms of knowledge that they prioritised in tackling case study problems. When investigating a problem-based scenario, the students from the healthcare pathway gave equal value to the personal narratives of group members, their 'life experiences' etc. and the knowledge that stemmed from academic sources:

> *Listening to other people's point of view builds on your academic knowledge and it gives you an understanding and appreciation of different characters and what they can bring to a case study*. (Tara, Healthcare student)

For the healthcare students, their previous experience of a weakly classified pedagogy had provided them with the recognition rule [21] of what forms of knowledge can be *legitimately* brought together into the PBL tutorial. They were accommodating of what they could learn from others and how this localised, everyday; horizontal discourse could be drawn upon to address the problem at hand. In comparison to the healthcare pathway, the students from the A level pathway prioritised the vertical discourse from academic subjects over the horizontal discourse of localised occupational therapy practice. There was a strong emphasis on the importance of 'academic' knowledge from the A level students because in their view, this was the knowledge that would be assessed and therefore it was what they *needed* to know. As Harriet notes, PBL group work was initially a strategic exercise in sifting out what she refers to as "the quality information" from students' personal narratives:

> *When I started [PBL group work] I thought other people might not bring back as good information as me, so then it would be up to me to go and do the research that they had been given, as well as my own. Basically if people bring information back and it's just from them, what they think, or what they've seen, then you are not going to need it… I would have rather had stuff with references on, things that you could put in to an assignment*. (Harriet)

For the occupational therapy students from the A level pathway, it was the vertical discourse that amounted to the 'sacred' knowledge [21] of the occupational therapist, whilst personal experiences of learning could be seen as 'profane' knowledge. This strong classification of different discourses meant that in contrast to the students from the healthcare pathway, the A level students had problems with the 'recognition rules' of a PBL curriculum that legitimately mixes vertical and horizontal discourse. Thus in their earlier experiences of the PBL course, the students from the A level pathway were not adept at recognising that PBL through its adherence to a constructivism conceives all knowledge as relative and undifferentiated [28].

The most striking example of how the students' contrasting educational pathways influenced their different perceptions of knowledge can be seen in relation to the subject of anatomy. Anatomy is an example of vertical discourse, and the students from the A level pathway thought this was a subject that they should learn. Moreover, there was an expectation that anatomy was a subject that ought to be taught:

> *It is not easy to learn anatomy through PBL. It is the one area that you need direction on, and especially in the first year I think you need someone to go and say, this is the best way to go and learn about the arm or whatever*. (Fay A level student)

The anxiety spurred by the feeling of not knowing enough about anatomy and medical conditions in general, seems common to occupational therapy students on PBL courses [9, 30]. The main employer for occupational therapists in the UK is the National Health Service and occupational therapy students may consider that a base knowledge of anatomy is the necessary currency to work effectively in this area. It is, after all, knowledge that they share with other medical and healthcare practitioners. But what was problematic for the students from the A level pathway was why a subject like anatomy that is seemingly applicable to a wide range of occupational therapy practice is studied in a 'context relational way' through PBL:

> *With anatomy you need to build from the basics and that's the downside of PBL. I don't teach PBL but personally I couldn't see why we didn't have anatomy up front. I mean it's important for every patient isn't it?* (Mia, A level student)

Anatomy was perceived as a subject that requires the student to be given a foundation from which their knowledge base is then developed. This again reflects how the A level students' previous experiences of education shaped their understanding of knowledge. The pedagogy of the collection code (the A level pathway) legitimises the 'specialised knowledge' of vertical discourse where knowledge and understanding is developed through the assimilation of disciplinary meanings. Within the collection code mastery of a subject begins with the simple, concrete knowledge of that subject with a general progression to its more abstract and universal principles [21]. Therefore, the A level students' previous experiences of learning prompted their desire to know the systems of meanings bounded by the disciplines of anatomy/ medical sciences in ways that move beyond the particular application of specific 'products' of disciplinary

knowledge in specific situations [31]. The students from the healthcare pathway were less concerned with knowing the 'fine grained particulars' of anatomical knowledge. Unlike the collection code, integrated styles of learning begin with an appreciation of the universal, the deep structures of knowledge and move to the concrete. From the start of the occupational therapy course, the healthcare students were at ease with the application of anatomy to a given problem-based trigger:

> *I haven't had a problem with studying anatomy or conditions on the PBL course. I did a lot of applied anatomy in my previous course, and I found it is something that you only use when you need it*. (Anna, Healthcare student)

Knowledge and Assessment on the PBL course:

As with the students' early experiences of PBL it is possible to differentiate between their views on assessment according to their respective educational pathways. For healthcare students like Susan, interpreting the marking criteria of first year assignments, proved to be potentially difficult:

> *Words like synthesis and also structuring as well, I found that quite difficult at first, but I think I've learned how to do it now.* (Susan)

Those who had followed a similar healthcare route echo Susan's comments:

> *When I got the essays back on the first year, the content seemed to be there, but I guess you could say there was no argument. There were not enough academic sources. There was none of 'so and so said this and so and so said that', you know, no opposing views. That was one of the only things that I would say I really struggled with when I started the PBL course*. (Kate)

Even though the students from the healthcare pathway were able to recognise that PBL encourages the mixing of different forms of knowledge discourse, they struggled to grasp the 'realisation rules' that enabled them to put these meanings together in the form of an assignment.

For the most part, the assignments in the first year required the students to show an understanding of 'generisable' principles, such as the strengths and limitations of assessment methods. Assignment tasks may specify a particular context, but the emphasis lies for example, on the students' understanding of the principles of occupational therapy assessment rather than the setting itself. Within the marking criteria concepts such as 'synthesis' call for the students to critique and integrate literature and not to synthesise theory with practice. However, as pointed out by Nerys, assessments on healthcare courses more often or not expect students to *apply* theory to practice:

> *When I came to uni, I didn't know what stuff like 'analysis' and 'synthesis' meant. I was used to like learning about human development and applying that in practice. Part of an assignment might be to observe a child's handwriting skills but you knew how to do that. It was clear what you had to do in order to get a 'C' grade and the depth you had to go to in order to get an 'A' grade*. (Nerys, Healthcare student)

Understanding how to construct the PBL assignments and how to make sense of the marking criteria was not problematic for the A level students. Their experiences of the collection code had prepared them for assessments that examined their understanding of the generalisable principles that transcend a given context. Therefore, they were able to realise what was needed from these first year assignments *despite* their initial struggles with the legitimacy of mixing knowledge discourses in a weakly classified PBL curriculum:

> *I think my A level in English literature taught me how to analyse and critique, I'm so glad I had that skill before coming to uni. I feel like I had a head start because of that. I have always done well with essays, I think I just 'click in' as to what the marking criteria is asking for. I just like critiquing literature and finding out stuff, and I guess that comes across*. (Paulette, A level student)

The assessment method that was least familiar to all the students was the viva voce. The students' first experiences of what is essentially an oral examination took place toward the end of the first year and following their first practice (fieldwork) placement. Here, the students from the healthcare pathway *were* able to 'recognise' from their first experience of the viva, the appropriateness of utilising horizontal discourse (everyday knowledge) within their plan:

> *The viva is about the knowledge you gain from placement. It's stuff like the knowledge of the local areas, to an extent what is out there in the community, things like being able to use a bowls group, the sort of day to day OT things, like knowing you can go to the Red Cross*. (Anna, Healthcare student)

In contrast, when deciding how to approach the viva, the students from the A level pathway prioritised vertical forms of knowledge above all else. The consequence being that these students tended to receive lower marks in the viva when compared to the other forms of assessment used on the PBL course:

> *In my first viva, I got a 'D' grade, forty something or other. I was disappointed with that*. (Harriet, A level student)
>
> *I had around fifty percent in my first viva*. (Gareth, A level student)

As with the other assessments, the viva was initially regarded by the students from the A level pathway as an opportunity to show their knowledge of a subject or topic. In the viva, the students placed more emphasis on their knowledge of a subject and less emphasis on their understanding of the everyday influences on occupational therapy practice:

> *In the first year the whole concept of the viva was something new, and I was just trying to 'kick in' what was wanted from it. I think initially I over complicated it and focused too much on the academic side of things.* (Paulette, A level student)

Success in the viva requires students to *realise* that the viva tests the students' ability to integrate vertical discourse, such as knowledge of anatomy or psychology with the procedural knowledge of occupational therapy practice.

Conclusion

This study explored the types of knowledge that occupational therapy students on a PBL course considered important for occupational therapy practice. Through drawing on the theoretical framework of Bernstein it has been shown that students prioritised different types of knowledge (i.e. horizontal or vertical discourse) as a consequence of their contrasting educational pathways into the PBL course. The students from the A level pathway tended to favour academic knowledge and this is characteristic of their experiences of the 'collection code'. In contrast, students from the healthcare pathway (representative of the 'integrated code') valued both academic and localised, forms of knowledge. Since the students from the A level pathway prioritised vertical discourse, when participating in PBL group work they struggled to recognise the legitimacy of integrating different forms of knowledge that is required from a 'weakly classified', 'weakly framed' PBL curriculum. However, the students from the A level pathway were able to realise how to undertake assessment tasks used on the PBL course despite their difficulties with knowledge recognition. This is because most of the assessments in the first year of the PBL course (other than the 'viva') required the students to demonstrate their understanding of vertical knowledge forms rather than the horizontal discourse of occupational therapy practice.

Although the study is limited in scope, the use of the methodological framework means that it is possible to generalise the findings beyond the research setting. Whilst, for example, assessments methods may vary between different PBL courses, the educational principles that underpin PBL curricula are more universal.

Recommendations

In response to the findings, it is recommended:

- The philosophy and aims of PBL curricula needs to be transparent so that all students, regardless of their educational background are able to understand that PBL requires the integration of different forms of knowledge discourse.
- Assessment methods should be explicit and course tutors need to make sure that students are aware of what is expected from the different assessments that are used on PBL courses. Ideally, assessments need to be aligned to students' learning.

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