

EDW04168

Teacher Education and Problem Based Learning: exploring the issues and identifying the benefits.

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Problem Based Learning has been used with increasing frequency in Higher Education settings since it was first conceived by Barrows and Tamblyn during the 1980's. Since this time PBL has been used in medical, engineering and education faculties to support pre-service students in the acquisition of skills and content relevant to their professions. This paper explores the perceptions pre-service teachers held of a unit of study conducted using the PBL approach. The paper explores the frustrations they experienced in participating in the unit as well as noting the perceived benefits for the students. The paper indicates that the students' frustrations should be acknowledged and steps taken to alleviate these in order to support students working within a PBL scenario. Opportunity for further research in this area is also described.

Introduction

The use of Problem Based Learning (PBL) in Higher Education has increased steadily since first developed by Barrows and Tamblyn at the Canadian based McMaster University during the 1980's (Major & Palmer, 2001, p. 2). Initially utilized as a means of ensuring that medical students were able to apply knowledge and respond to 'real-life' situations rather than simply acquire course content, PBL has evolved over the intervening years into a popular learning approach, particularly within medical and/or engineering faculties (Eden, 2000, p. 55).

As a learning approach PBL draws on essentially constructivist and social constructivist principles of learning, advocating student centered engagement with course materials and content as well as student interaction with peers as central to the process associated with learning how to apply theoretical knowledge to professional contexts. In this sense, PBL similarly emphasis the relationship between theory and practice, and as such has been seen as value in those professions such as medicine, nursing and engineering with a strong theory to practice nexus. According to Savin-Baden (2000), PBL is characterized by several pedagogical beliefs including:

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1. An acknowledgment of learners' experience base
2. An emphasis on students taking responsibility for their own learning
3. An intertwining of theory and practice
4. A focus on the processes of knowledge acquisition rather than the products of such processes
5. A focus on communication and interpersonal skills so that students understand that in order to relate their knowledge, they require skills to communicate with others (Savin-Baden, 2000, pp. 5 -6)

Research aimed at evaluating the effectiveness of PBL in terms of student learning indicates that the pedagogical beliefs underpinning the approach serve to support students in acquiring abilities considered important within the modern workforce, including; communication skills, the ability to locate and access appropriate resources, critical thinking and increased capacity for problem solving (McPhee, 2002). In more recent times the educational benefits associated with PBL have slowly gained attention in the teacher education literature. Here it has been argued that PBL offers teacher educators an important vehicle which exposes students to situations they are likely to face as professional educators whilst simultaneously practicing a teaching and learning approach that encapsulates the central tenets of constructivist and social constructivist learning theory (Dean, 1999). Previous research in this area has indicated that PBL supports pre-service teachers in acquiring important theoretical concepts and assists them in learning to work with others on a professional basis (Murray-Harvey & Slee, 2000). However, whilst the positive outcomes associated with the use of PBL have been noted, more recent investigations are also beginning to explore the issues of concern that are faced by students studying within a PBL approach.

Holen (2000) identifies as a major issue of concern the potential difficulty students may face when asked to work within group-based PBL learning scenarios. Holen argues that in order for students to benefit from their participation in a PBL exercise that educators utilizing the approach need to be sensitive to fluctuations in group dynamics rather than assuming that group participation itself will result in positive learning outcomes (Holen, 200, p. 488). Further research by Dahlgren and Dahlgren (2002) into physiotherapy, computing and engineering students' perceptions of PBL similarly highlighted the possible issues students face within group situations when working within a PBL framework (see also MCPhee, 2002 and Murray-Harvey &

Slee, 2000). In addition, Dahlgren and Dahlgren indicated that the process of initially delimiting the issues and their responses to these issues can prove frustrating to students (Dahlgren & Dahlgren, 2002, p. 118). This finding was one similarly established by Edens (2000) who found that students could be perturbed by the open-ended and changing nature of PBL:

“Some features inherent in the PBL process (e.g. an ill-structured problem that is intentionally ambiguous and changing) created difficulties. When the problem was initially introduced, several students asked me to ‘show us exactly what you want us to do’ or asked for ‘more structure and guidance.’ One open-ended response to the evaluation indicated that ‘the assignment was not clear’” (Edens, 2000, p. 59).

In light of these findings, PBL may be considered to hold certain frustrations for students, chief amongst which seems to be issues associated with group work and with the delimitation and response to the very problem forming the basis of the experience. Whilst the perceived benefits of PBL have been well documented in the literature, consideration of the issues students face in utilizing the approach are important to its continued development as a pedagogical approach. The findings reported in this paper examine the responses pre-service teachers enrolled in a unit of Child Development study had to the experience of participating within a PBL scenario. In this paper, both the benefits and frustrations reported by the students are presented.

Methodology

The study was conducted as examination of pre-service teachers perceptions of their experience within a unit of Child Development study conducted as a PBL scenario. Participation in the unit involved pre-service teachers working in groups of five to address the learning and developmental needs of a fictional child named Laura. Each member of the group was assigned a different stakeholder role in Laura’s life, including her mother (Chantelle), early childhood educator, case-worker, primary teacher and the parents of Laura’s peers. Pre-service teachers were provided with a weekly “chapter” from Laura’s life which was posted to the unit website over the course of the semester. In this way, the normal events of Laura’s life were seen to occur in ‘real time’ with the pre-service teachers responding to these events in her life according to their particular stakeholder roles. Laura was described in the first

chapter as a child of 4.9 years and tall for her age. Various behavioural patterns exhibited by Laura in the early childhood educational setting were noted. In addition, the pre-service teachers were made aware that Laura had recently been removed from her mother's custody after Chantelle had been arrested for soliciting whilst Laura was in her care. Pre-service teachers were required to work within their groups according to their stakeholder perspective in order to address Laura's developmental and learning needs as they unfolded during the thirteen week semester. To ensure their full participation in the situation and to respond adequately to Laura's needs the pre-service teachers were required to research the responsibilities and issues associated with their stakeholder roles.

The unit was delivered using the traditional Lecture/Tutorial format where lecture material addressed a specific topic of influence on child development prior to the students attending a tutorial. Each lecture topic tied in with the events in Laura's life as they unfolded across the weekly chapters. Tutorials were used as an opportunity for pre-service teachers to work in their groups of 5 stakeholders, each taking turns to share the results of their personal research from their individual stakeholder perspectives. Pre-service teachers' assessed tasks were related to the presentations they gave their peers regarding Laura's needs and on the development of a learning plan for Laura's future. In addition, the completion of a reflective essay on their experiences within their roles and the import of these experiences for their pedagogical beliefs were also assessed. Further opportunities for discussion between the pre-service teachers were available through the unit website which was heavily integrated with the PBL scenario and provided pre-service teachers with links to resources and facilitated discussions between like stakeholders across all of the small working groups.

The pre-service teachers had not previously participated in a PBL scenario of this type, and whilst they may have participated in group work situations previously, the nature of this activity meant that the group work was highly collaborative. Using the discussion forum and chat features in WebCt was also a new experience for some students.

Data regarding the pre-service teachers' perceptions of the PBL scenario and its effectiveness in supporting their understanding of the relationship between theory and practice were collected using an anonymous questionnaire administered at the conclusion of semester (n = 54). The questionnaire contained ten statements linked to a five point Likert scale [strongly disagree (1) to strongly agree (5)] as well as the use of three qualitatively orientated statements aimed at determining benefits and/or frustrations students perceived as characterising their participation in the PBL scenario. Data arising from the responses to the Likert scale were calculated in percentages and considered in terms of a mean response and data from the qualitative responses coded in NVIVO and analysed thematically. This paper focuses on the responses to two of the qualitative questions, including:

- What were the issues, frustrations or difficulties that you faced by participating the Problem Based Learning scenario?
- Do you recommend that Problem Based Learning be used in this unit next year?

Results

Coding of the data for these two questions resulted in the identification of three main themes per question. The identified themes are presented in Table 1 under the headings Issues (what were the issues, frustrations or difficulties that you faced by participating in the PBL scenario) and Recommendations (do you recommend that PBL be used in this unit next year?)

Table 1 identified themes comprising the pre-service teachers' responses to questions about the issues and benefits characterising their participation in the PBL scenario

	IDENTIFIED THEMES
ISSUES	<ul style="list-style-type: none"> • Need more direction about how to approach the task and the assessments • Problems working with other people in the group • Difficulty understanding stakeholder roles
RECOMMENDATIONS	<ul style="list-style-type: none"> • No, because it is too hard to understand the stakeholder roles • Yes, because the learning is realistic • Yes, because the learning is empowering as a student and future teacher

Discussion

The students' responses to questions about their participation in the PBL scenario were characterised by both issues of concern and recommendations for the future use

of PBL. Each of these are examined in further detail with reference to the qualitative data from which they were drawn under the appropriate headings.

Issues

Three main issues were identified in the pre-service teachers' responses to the question, *'what were the issues, frustrations or difficulties that you faced by participating in the Problem Based Learning scenario?'* Here students recorded difficulty with understanding of the task, the assessed requirements, working other people in the group and with understanding their stakeholder roles. In general, the first of these frustrations was recorded by students describing difficulties in understanding what was expected of them with respect to the task and the assessments (presentations). This was expressed by one student as not knowing *"where to start"* and by another as *"difficult to understand exactly what was required of us during the presentations and what was to be involved"*. Early postings to the Discussion Forum were similar in nature with students asking each other and the lecturers exactly what they needed to do:

"How and where do we start researching our presentation Suzy?"

"Ok., so what exactly are we supposed to start with in here? I am drawing a complete blank right now, so I thought I'd at least get some feedback to get things kicked started"

"I am wondering how we can start? I can't wait to see all your ideas"

For some students, this difficulty was more clearly defined as arising from a perceived lack of boundaries associated with the problem and the tasks arising from participation in the problem:

"The lack of boundaries and guidelines on assessment task was a problem"

"I was not really clear on what was expected, there was a lack of clarity of the explanation"

It is interesting to note here that the assessment task involved a series of statements as to what each presentation was expected to contain (for example, a summary of theory relative to Laura's development and the articulation of strategies from such theory aimed at supporting her learning). However, as each student was allocated a different stakeholder role, the assessment tasks did not outline exactly *what* each stakeholder (i.e. in terms of theoretical perspectives) would be expected to refer to and why.

Rather, as is the purpose of PBL, the students were expected to examine the problem from their particular stakeholder perspective, identify the theories (from the lecture material) of relevance to them and then argue why these theories were important in the strategies they were proposing to support Laura in her learning and development. Thus from the students' perspective, the assessed tasks were perceived as being 'unclear' whereas from the lecturers' perspective the assessed tasks were perceived as representing a generic description of ways in which the students were expected to develop a response according to their perspective on the problem. As an issue facing the students this difference in perspective is important, since it indicates that the students may need more time and support in coming to understand what is expected of them as *learners* when participating in a PBL unit. This is to say, that perhaps a clearer explanation of why the assessment guidelines were generic in relation to the unfolding problem would have assisted the students in approaching the task with more confidence. In addition, such explanation would have taken into consideration the students' previous inexperience with PBL. This was an issue noted by two students, who suggested that the newness of the approach meant that they didn't necessarily have the skills to know where to start:

"To begin with, I didn't understand what we had to do, as we had never participated in this before and I found it difficult to complete the first assignment until a few days before"

"Since this was a new of doing a subject, everyone was quite stumped on what to do"

The second issue identified by the students was associated with the group experience. In the main, this appeared to be a difficulty only in those situations where other people were perceived as letting the group down by not attending tutorial sessions:

"Every week some people were away and this let the team down a bit"

"The main frustration I found was centred on being in a group and having some students not attending classes"

"It was frustrating when group members did not show up"

"If someone couldn't make a tutorial then you would have to wait a week to get their point of view"

When group members missed tutorials this had the effect of restricting a group in proceeding with its plans for Laura until all stakeholders had been consulted (in one

particular group where Chantelle failed to appear two weeks running, the absence was incorporated into that group's storyline with the case worker then arguing that she was obviously not interested in regaining custody of her child). Other issues of concern were related to the dynamics of the group, and interestingly tended to express frustrations that were likely to face students upon graduation in any instance, such as *"people in groups have fixed ideas and are not open to others"*, *"stakeholders try to push their own agenda"* and *"it is hard to respect the rights of other people who have different opinions than myself"*. These findings associated with the students' experience of the group have also been noted in the literature (Holen, 2000) and may require some form of meditation to be built into the problem or the unit structure which provides for pre-service teachers to approach lecturers for assistance as students, and/or in which a higher body represented by the lecturers is built into the problem scenario. Such a structure would allow students an avenue in which to express frustrations occurring within the group when they were not able to resolve these alone. However, experiencing such frustrations within the relative safety of the course was noted by one student as beneficial, with her participation described as *"practical, and I could see how others in our group reacted and I could then relate this to real life problems I might face"*.

The third issue identified as cause for concern for the students was associated with their stakeholder roles. Here students were concerned that they didn't know enough about a particular role to participate in the scenario. This appeared to be the case for students assigned roles such as Chantelle (Laura's mother), the caseworker or a parent of a peer attending Laura's preschool. For those students assigned teaching stakeholder roles the difficulties did not appear to be as pronounced since this was a perspective they were used to aspiring to and/or operating within. This was an issue identified by one student who suggested that a significant frustration had been *"not fully understanding my role. I think the parents and the Chantelle's probably faced a more challenging area since it really moved away from what we know"*. One student, who had been assigned the role of Chantelle, commented on the fact that *"the other stakeholders did not listen to me as Chantelle"*. This had been an issue of concern noted in detailed discussion on the website in which the various Chantelles discussed the dismissive attitude of the 'professionals' (i.e. teachers and caseworkers) in listening to them as they attempted to regain custody of Laura. The following sample

taken from the discussion forum highlights the manner in which the Chantelles felt scared, judged and attacked by the other members of the group:

“I don't know how you guys all went during the first 'meeting' with everyone, but I found it kinda scary. Everyone was having a go at me!! I'm really not sure where to take it from here. I think I'm going to go with a Chantelle who is going to try and clean up her act and get Laura back. I was thinking about taking parenting sessions and anger management programs”

“Yes, I also felt very attacked. It made me aware that you can not take all the decisions about a child away from the parent. I was only offered one suggestion with regard to contact at the kinder and when I disagreed I was made to feel stupid. The school teacher even suggested I should not be part of transition to school because I am so 'unstable'. I was not provided any information that would have been at 'my level' given the possibility of my minium education level, theorists are not part of my daily dialog. Get real kindergarten and primary teachers!!!!!!!!!!!!”

Having to acknowledge and understand the various perspectives of other stakeholders within their groups was a difficulty for some students, and an issue one student noted was related to her uncertainty about “*the roles of stakeholders whose job we hadn't studied before*”. This raises an interesting dilemma for the use of PBL learning in teacher education, namely should all PBL in teacher education revolve around students taking the teacher stakeholder role? Or is there benefit in students being forced beyond the role they will assume upon graduation into some of the roles of the people (whether other professionals or parents) with whom they will interact as future educators? As an initial foray into the use of PBL in teacher education the data set informing this paper is limited in answering such a question, however, the presence of this frustration as noted by the students in this paper raises the potential for further investigation as to the manner in which roles should be developed and assigned when utilising PBL in teacher education programs.

Recommendations

Recommendations related to the students view on whether or not PBL should be used in the unit in the future. Here two students suggested that PBL should not be used again as it was too difficult for students to understand the various stakeholder roles involved in the scenario. However, the remaining students (n=52) indicated that PBL should be used again, with these responses positioning the experience as realistic and as empowering for student teachers. The realistic nature of the experience appeared to be an important component of the students' participation in the scenario:

“I really enjoyed it and feel that it was a great way to look at different issues. It gave you a real life example to relate your strategies and theories to”

“Although it was extremely time consuming and difficult to work through, the learning and the understanding obtained from the experience was immeasurable. It was almost like being on a practicum and working on a real life situation. It suggests that when teaching I will need to adapt to a range of experiences that may occur and develop skills to deal with these”

“It really makes you think and brings the realities of teaching and some of the issues you may face in reality home”

It is interesting to note that whilst the realistic nature of the exercise was valued, the students had still felt frustration at the lack of ‘boundaries’ surrounding the problem. This finding is congruent with Edens (2000), whose experience in implementing PBL likewise found that students can struggle to accept the ambiguous nature of the problem. However, it seemed that the students were still able to see that the structure of the problem itself mirrored the manner in which events in a child’s life would play out during the course of a semester. For one student the reality of this situation was praised as offering “*students hands-on experience and practise before having to take on situations like this in real life*”. Participation in the PBL scenario was perceived as an opportunity to develop and practice skills that the students saw as being necessary to their work as educators, and as consequence was perceived as offering “*a real life example to relate your strategies and theories to*”. This particular opportunity appeared to be valued by the students and is represented by the third theme noted under the Recommendations heading. Here, the students described their experience in the scenario as having empowered them as students and as future teachers. For one student, the notion of empowerment was linked to ‘hand-on’ nature of the experience:

“It gives students hands-on experience and provokes them to see a scenario from all different perspectives. It empowers us with all the skills related to our field of teaching”

For this student participation in the scenario was linked to a feeling of confidence in acquiring the skills that were related to teaching, not just the acquisition of theory (which another student more aptly described as “*more realistic than dumb theory and thus more relevant*”). The idea that students would be empowered to grow as people as a consequence of their participation in the unit had not been fully anticipated by the lecturers. Rather, the initial aim in establishing the PBL scenario had been to provide

a context through which relevant theory could be explored and utilised by the students. However, one student commented on the manner in which participation in the scenario was seen to *“encourage student teachers to better understand themselves, their responsibilities and [it] provides them with valuable tools when handling a similar situation”*. This idea was likewise explored by another student, who commented on the manner in which participation in the PBL unit impacted on students’ perceptions of learning and therefore teaching:

“It is a great way to help us develop more skills and a greater understanding of the ideas that were covered. Allowed us all to be become better learners and therefore better teachers. I was able to look at my teaching ideas and build upon these. We also gained more of a professional view on the PBL”

Here, the notion of empowerment was evident in this student’s reflection that the experience had *“allowed us all to be become better learners and therefore better teachers”*. The comment is insightful in its recognition of the relationship between teaching and learning, rather than an emphasis on her role as a teacher alone. Such feedback from the students indicated that there would be professional and theoretical value for students should the unit be run as a PBL study in the following year.

Conclusion

PBL has become an increasingly popular pedagogical tool since its first inception at McMaster University during the 1980’s. The approach is particularly suited to teacher education in that it offers students the opportunity to acquire skills and theoretical content relevant to their future careers within the relative safety of the University environment. The benefits of PBL have been previously reported described as improving students’ communication skills, their ability to locate and evaluate relevant information and an increased capacity for problem solving (McPhee, 2002). In this paper, the benefits associated with participating in a PBL scenario were described by student teachers as related to the realistic nature of the experience and in the opportunity to develop skills considered necessary to them as future teachers. However, it is important to acknowledge that amongst the benefits of PBL the experience can still be characterised by a series of frustrations for students. In this paper, these frustrations referred to the students’ perception that the task was ambiguous, that there can be difficulties in group work and in understanding the nature of stakeholder roles outside of students’ immediate experience. Whilst it is

difficult to remove ambiguity from a learning approach based on the presentation and solving of problem, issues associated with group work and stakeholder roles could be addressed by briefing students more specifically and by building avenues to address interpersonal difficulties into the problem itself. Supporting pre-service teachers to develop skills associated with effective collaboration in a group setting would seem to be an important aspect of providing appropriate scaffolding within the PBL experience. Further research regarding the stakeholder roles assigned to student teachers would be of interest in determining whether or not they benefit most from 'teaching' only roles, or from the opportunity to experience the perspective of other professionals and/or parents.

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