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Conference paper

What do students feel about PBL? Discussion of interim findings from a small scale study of medical and education students' experiences of problem-based learning in a Scottish university.

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Abstract

This paper looks at the experiences of problem-based learning among groups of medical and education students in the University of Glasgow. PBL has been in use in the university in a number of different contexts for some time now, and this paper sets out to give those participating in professional education taught by this methodology a voice in assessing its effectiveness and in articulating their own experiences of it. Using qualitative methods, students were invited to respond to a range of issues. The results indicate acceptance for the methodology as an effective teaching medium, but indicate a range of differing perceptions both between the 2 groups and within the groups themselves.

Context

Problem based learning has been a feature of professional education for some time, since the publication of the work of Barrows (1980). First designed for use in the medical and health care fields, it has found acceptance in other areas of professional learning (see Boud and Felletti, 1997). More recently, it has been used in the professional education and formation of teachers (McPhee, 2002; MCPhee and Patrick, 2003; Savin Baden, 2003). At the University of Glasgow (Scotland), problem-based learning has been a feature of the professional education of doctors for some time. It has also been used as a teaching and learning method in courses of initial teacher education, both at undergraduate and graduate levels (although not on the same scale as in the Faculty of Medicine).

Following upon a growing sense of professional co-operation between the Faculties of Medicine and Education, a special study module in education and working with children was devised for third year medical students. This module involved the employment of the Education Faculty's issues based methods, as well as a short period of school experience placement. The present study looks at perceptions of problem-based learning (PBL) among two small cohorts of students and seeks to expand our understanding of how they perceive PBL as relating to their professional development in their own disciplines (medicine and education). Two groups of students were invited to participate, the group of medical undergraduates described above who were undertaking the special study module and a professional graduate group of education students who had experienced this methodology as a part of their course. All of the medical students

had prior extensive experience of PBL methodology; only 5 of the 20 Education students had experience of PBL prior to beginning their education course. These 5 students had gained this experience in previous professional contexts (including paramedical work).

PBL as method of learning

Problem-based learning has become a well-used medium for professional education over the past 25 years, although the concept itself can be traced back to Dewey (Menon, 1997). PBL is now widely recognised as an appropriate and valuable methodology for medical education and for education in the healthcare professions in general (Alavi, 1995; Schwartz et al, 2001). It is characterised by a number of features, the most important of which are that

- students address a number of challenging, sequenced problems;
- the problems are ‘loosely constructed’ to invite multiple valid ways to respond;
- students work co-operatively in small groups;
- the role of the teacher is changed from that of instructor to that of facilitator.

(Barrows and Tamblyn, 1980; Levin, 2001).

PBL has now developed a whole set of associated teaching methodologies as it has become more established (e.g. Schmidt, 1983; Walton and Matthews, 1989; Savin-Baden, 2000, Tan et al, 2005), and is sometimes seen as being associated with inquiry-based learning (where learning takes place in a situation which is largely owned by the student) (see Papert, 1980).

The development of PBL has been accompanied by a considerable volume of research into the processes of learning which occur when PBL methodologies are used (see Barrows, 1988; Delva et al, 2000; Smits et al, 2002; Wood, 2003), and this has included research into the use of technology to facilitate the investigations (Hoffman and Ritchie, 1997, Fletcher and Dodds, 2003), as well as comparisons between PBL and more traditional learning and teaching methods. These last studies are of interest for this paper. It is fair to say that there is some ambiguity about the effectiveness of PBL: for example, the meta-study by Vernon and Blake (1993) supported the view that PBL was superior to traditional methods, but more recent work has been more guarded (see Colliver, 2000). Smits et al’s (2002) review of PBL studies found that there was ‘cautious’ support for the

use of PBL in undergraduate medical education in terms of increasing students' medical knowledge and performance.

However, the way in which PBL is used with students is important. Kirschner, Sweller and Clark (2006) argue that guidance during the instructional process is essential, to mirror the way in which human cognitive architecture is designed to function; this stance has been challenged by Schmidt et al (2007). Qualitative studies have examined the important context of student perceptions and related these to learning effectiveness (Bridges, 1992, in Hoffman and Ritchie 1997; Willis et al, 2003). Indeed, some of the important issues which emerge from consideration of the literature on PBL are related to the nature of learning itself. We understand, now, a great deal more about learning and cognition (e.g. Medin et al, 2001) than we did when Howard Barrows pioneered the PBL methodology more than 20 years ago. In stressing the importance of experiential, collaborative and social learning, PBL builds upon many of these new understandings and relates them to the fields of application in which it is situated. In its nature, it fits with modern constructivist educational theory (Jarvis et al, 1998).

However, PBL is not a fixed concept: it changes according to the contexts and situations in which it is used. It is fair to say that, within the concept of PBL, two main models have begun to emerge (although Savin-Baden (2000) identifies five variants). These two main models are:

- 1 the construction of an entire course according to problem based learning principles;
- 2 the construction of courses where the main focus is on problem-solving activities within a social and experiential learning framework (Maudsley, 1999).

In the present study, the medical students have had PBL as one of their main ways of learning throughout their course of studies, while the education students have largely engaged with the methodology in a less intense manner. For instance, while some parts of the education curriculum have made extensive use of PBL, others have not (although there is within the education programme a largely constructivist philosophy at work across its constituent elements).

Methodology

The investigation was carried out by the use of a standardised questionnaire which was distributed to medical and education students. The questionnaire contained 15 items assessed on a 5 point Likert scale, with 1 indicating strong agreement and 5 strong disagreement. Questions were structured to include reverse questioning to check on validity of previous responses. Additionally, there were 6 free-text boxes which would allow students to develop their perceptions of the following areas:

- Details of previous experience of PBL (if any).
- Particular scenarios which they felt had been particularly useful.
- Professional skills which were perceived to be better developed by PBL.
- Professional skills which they thought had been better developed by other methods.
- Advantages of utilising PBL in professional education.
- Disadvantages of utilising PBL in professional education.

Questionnaires were analysed by tally marks and resulting arrays in the case of the Likert scale items, and by response listing in the case of the free text items. Where several students made the same or similar free text responses, this was recorded.

The questionnaires were distributed to both medical students ($n = 7$) and to education students ($n = 28$). Return rates were 4 (57%) and 20 (71%) respectively. The comparatively low return rate for medical students is partially explained by the pattern of clinical placements which they have to undertake in their third year of the course. Because of the small numbers taking part in the study it is acknowledged that no broad inferences can be taken from the results, and no attempt at representativeness can be made. The intention of the study was to act as a pilot for a method which could be used across a larger group of medical and education students within the university. The larger study may indicate different perspectives.

Results

The questionnaires were divided into 3 main sections: perceptions of the efficacy of PBL as a learning methodology; professional skills which were developed (or not) using PBL; and perceptions of the advantages and disadvantages of PBL as a learning medium.

Efficacy of PBL as a learning methodology

There was general agreement amongst both education and medical students as to the effectiveness of PBL as a learning methodology. Both groups reported that they were enabled to see the key points and that in general they were motivated to learn by PBL methods – although a small but significant minority of the education students did not find it a motivating medium. Whereas the medical students as a group felt that they were encouraged to find out more about the topics through PBL methodology, the education students were again more reluctant to do so. Both groups reported strongly that they found working with other students helpful and beneficial and very few responded that they found it distracting. The medical students were more neutral in their view of the scenarios which were used with them than the education students: again, while most education students found the scenarios helpful, a significant minority did not. However, both groups felt strongly that the most memorable scenarios were the more dramatic ones:

We have had hundreds of scenarios and I suppose the most memorable ones are the most dramatic. For example, a road traffic accident resulting in a fractured spine. (Medical student.)

The education students commented that the more memorable scenarios were those involving, for example, child protection issues and family backgrounds, although a minority also commented on the effectiveness of scenarios involving classroom discipline and behaviour, and teacher identity.

Whereas the medical students were likely to follow up scenario work with related reading on the topic, once again the education students were less likely to do so. However, the medical students found it more difficult to relate to the materials which were used as a focus for their PBL sessions than the education students. Both education and medical students were quite unenthusiastic about the efficacy of PBL methodology in developing practical skills: most were either unconvinced or neutral about this aspect.

Professional Skills Developed by PBL

Medical students felt that the skills which were best developed by PBL methodologies were teamworking and interpersonal skills:

Team work is the main one. Being able to listen, ask questions of others. PBL group members is important for learning. Also others asking me questions allows me to see how detailed my knowledge is and if any gaps exist.

(Medical student.)

However, one was less convinced about the effectiveness of PBL in other areas:

PBL does not help us to develop the communication skills necessary to fully interact with patients-taking histories, explaining procedures/results/diagnosis. These are best developed using a hands-on approach with real patients (or “actors”) under the guidance of other medical professionals. (Medical student.)

Education students found their experience of PBL relevant to their professional life, and a range of skills and activities beyond the interpersonal skills were cited. These included:

- Puts legislation in a real life context.
- Improves professional knowledge.
- Thinking about the wider contexts and responsibilities of teaching.
- Helped with knowledge and understanding of partnerships.
- Helped to associate the research base with professional practice.
- Promoted independent learning.
- Collegiality

Some areas were identified by education students as particularly well suited to PBL.

These were

- Professional reflection.
- Thinking closely about issues.
- Develop ability to see into the core of an issue.
- Behaviour management.

Education students felt that some classroom based skills including lesson planning, were best developed by other methods.

Advantages and disadvantages of PBL as a learning medium

Amongst both medical and education students there was a very strong feeling that PBL was more demanding than lectures. However, while a substantial majority of education students wished to see PBL methods extended into other areas of their university course, medical students were much more reluctant to see this occur. Similarly, while most education students felt that PBL made them feel responsible for their own learning, once more the medical students were more unsure on this issue. Both groups of students were reluctant to commit themselves to an opinion that PBL should be the main mode of instruction in their courses.

When asked about the advantages of PBL, one medical student noted:

It encourages the student to think for themselves and research the material. As the student then has to feedback material to the rest of the group, it highlights any gaps in the knowledge (compared to the rest of the group, which may or may not be significant depending on the rest of the group) and instils confidence in the areas which they feel they have understood well and are effectively able to “teach” to the rest of the group. Depending on the group dynamics it can also be good fun and really interactive-the other side of this is that it can be very intimidating. (Medical student.)

Education students listed the following advantages:

- Made you think about the issues in depth.
- Real life approach and practical situations.
- Interaction and discussion with peers in different subjects.
- Involvement instead of pressured learning.
- Puts learning into context.
- Encourages ownership of the learning.

Consideration of the disadvantages of PBL showed a slightly different, but related pattern of response and again relating to practical applications of knowledge:

I think in general individuals benefit from researching material themselves, but it would be advantageous to complete the picture with some closure about what are the key points, rather than leave students wondering if they have really covered all the material in enough depth. Invariably whilst in hospitals or working with GPs we find gaps in our knowledge in topics we are supposed to have covered. It feels as though sometimes we are researching everything without really focussing on what's crucial. (Medical student.)

Difficult areas of study are not always resolved through PBL. (Medical student.)

Education students focused on pedagogical issues, and listed the disadvantages as follows:

- PBL can be too front loaded from tutor's point of view.
- Some topics confusing – needed explanation.
- Some students unenthusiastic / uninvolved.
- Some students don't prepare.
- Hard to relate to educational theories.
- Not good for introducing a topic.
- Sheer volume of material.
- Keeping attention going throughout the debrief.
- May not go into material in enough depth.
- No right and wrong answers.

Conclusion

What is clear from both sets of students is that there is general approval for PBL as an effective learning medium. When dramatic or particularly relevant scenarios are used for

the students to investigate, the effectiveness of the method is perceived to increase. The collaborative experience of working together is seen as an important dimension by both parties. It is perhaps disappointing that the education students seem to be less prepared to follow up the tutorials with reading and research than the medical students: however, this is regrettably the pattern observed in earlier research in the University (McPhee, 2002).

Problem-based learning, after an initial surge in popularity, has become subject to critique and appraisal (Colliver, 2000). Moreover, differing paradigms of PBL have been identified and associated methodologies developed (Savin-Baden, 2000). Recently, there has been research into the roles played by guidance and instruction and how the method squares with new understandings of human cognition (Kirschner, et al 2006; Schmidt 2007). This investigation, admittedly small-scale and within a single institution, has explored students' perceptions of PBL across two paradigms, and has attempted to give them a voice to express how the process has affected them as learners and also as developing professionals. The investigation will be continued with similar groups over the current session, and the evaluative process repeated. In this way it is hoped to extend our knowledge of the process and to see if the results are replicated with different year groups pursuing the same courses.

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