Article

Problem-based learning the distance learning way: a bridge too far?

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Since problem-based learning is classically associated with campus based, small group learning conducted over protracted periods of time, it should not, in theory, be well suited to the distance learning mode of study. Just how do you write distance learning materials which adequately accommodate the problem-based learning process, and which acknowledge the variety of problems that could be identified for study? This paper critically examines one distance learning initiative designed to test whether problem-based learning may be delivered to student benefit at post-registration, undergraduate nurse programme level.

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Manuscript accepted: 14 April 1999

Introduction

This paper draws upon the experiences of introducing problem-based learning into one module of the Bachelor of Science with honours degree in Nursing Studies by distance learning degree at the RCN Institute. It offers a critical review of what is involved in writing problem-based learning materials, arranging tutorial support for students, and then assessing students' coursework. To introduce this review a brief outline of the tenets of problem-based learning is provided, together with a description of the framework used to promote an inductive learning process within the module. Finally, the paper considers what lessons may be drawn from this experience, at a time when nurse education is increasingly challenged to be competency based, practice relevant and transparent (Bradshaw 1998, NHS Executive 1998).

Exploring the Art and Science of Nursing II (EASN II) is the second of two nursing scholarship modules presented within the BSc (Hons) degree in Nursing Studies. It is presented at the end of the first year of part-time distance learning studies and is designed to consolidate students' appreciation of nursing, as well as to develop ways of building practice knowledge. Problem-based learning was introduced within *EASNII* to help students integrate theory and practice, and to counter what Bradshaw (1998) has called the 'romantic curriculum'. Problem-based learning addresses the untidy world of practice, considering constraints and opportunities as these are, rather than expounding how nursing 'should be' in ideological terms. To this end, the module included a guide to ways of analysing problems and understanding practice decisions. 'Theorising in practice' (Price 1998) is a problem-based learning approach to the creation and update of practice knowledge. It was written so as to reference theory, philosophy and research within the nurses' critical thinking about practice.

One hundred and one post-registration nurse students completed this module during 1998, studying the module through study centres across the UK. Data on students' experience of the module was gathered through a whole cohort postal questionnaire (number returned: 66). The eight tutors were also surveyed using a questionnaire (number returned: five) with

DOI:10.1054/nedt.1999.0379, available online at http://www.idealibrary.com on IDEAL®

follow-up discussion of the tutor experience either during a staff development day or by telephone (six responses, two of them from colleagues who had not returned the questionnaire). During the 15 week module tutors provided three Saturday group tutorials, as well as answering students' individual queries and concerns by telephone, e-mail, fax and letter. Students were at liberty to choose their assignment question from a choice of three. Sixty-nine students opted for the problem-based learning assignment, whilst others chose concept analysis or the critique of nursing diagnoses.

Tenets of problem-based learning

Problem-based learning has its origins within the medical education of North America during the late 1960s (Barrows 1996). Presented with criticisms that medical teaching was too abstract and theoretical and that it did not help medical students to make sense of the real world of practice, Barrows and others (Barrows 1994, Barrows & Tamblyn 1980) designed an education that exercised students in the processes by which physicians gathered information, diagnosed problems and then devised solutions. The problem-based learning approach is initially inductive, encouraging students to draw upon experience, and to reason what was observed or discovered, even before a body of theory has been taught. It was an approach that focused upon group work (Little & Ryan 1988, Creedy & Hand 1994), and the development of students' skills of inquiry (Barrows 1985). Tutors functioned as facilitators of learning (Rangachari 1996, Verma et al. 1988). Problem-based learning was campus based, and involved intensive small group discussion. Whilst it has attracted critics over the succeeding decades (e.g. Doring et al. 1995), it has continued to thrive, either as the basis for a whole or part of an educational curriculum. The possibilities of problem-based learning as a tool within distance-learning nurse education has gone largely unexplored, although Hengstberger-Sims and McMillan (1993) and Hoffman and Ritchie (1997) highlight the importance of well designed media packages within problem-based learning. Biley and Smith (1998), meanwhile, have acknowledged the difficulties of presenting a whole curriculum using the problem-based learning approach.

Problem-based learning presumes that students can overcome their anxieties about learning through discovery, especially at a stage when substantial theory on the subject has not been taught. To manage this, the teacher is cast in the role of facilitator, fulfilling similar supportive roles to those in research supervision. Learning is conceived as a sequence of problem reading, recognition of what is not yet understood, additional focused inquiries, and synthesis of new information. Learning involves some anxiety (Doring et al. 1995), but this is believed to mimic the uncertainty associated with learning and making decisions in practice.

Because students explore their own misconceptions in this form of learning, it is usually conducted away from the clinical setting, but with investigative visits into it. Practitioners are seen as sources of expertise (Barrows 1996). The contribution of the tutor is process rather than content orientated. Whilst the tutor may know an eloquent answer, he or she does not solve the problem for the student. Rather, the tutor helps the students to arrive at their own insights en route.

Writing problem-based distance learning materials

Given that problem-based learning focuses upon groups, student inquiry and learning as a process, the writing of distance learning, problem-based materials would seem to be at best difficult, and at worst impossible. Fundamental questions arise, the first of which is whether the author prepares problem case studies and leaves the analysis process to the guidance of the individual tutor? The merits of this approach is that tutors can readily anticipate what aspects of the problem may challenge the students. Against this, the problems devised by an author often seem contrived and may quickly become dated. The alternative approach (and one adopted within the above programme) is to write learning materials about the process of problem analysis, leaving the students to identify appropriate problems (itself a key skill) and the tutor to help them to shape the analysis of the problem thereafter.

'Theorising in practice' (Price 1998) was written on the premise that tutors would not be familiar with problem-based learning, and that

whatever frameworks were suggested for the facilitation of learning had to be flexible enough to promote imaginative inquiry. It was important to explain to students that the frameworks were heuristic, and designed to help them to think laterally. Distance learning has often been criticised for constraining rather than liberating the thinking of students (e.g. Evans & Nation 1989), so the preparation of this material also became an exercise in countering the shortfalls of this mode of study.

Within the Study Guide problem-based learning consisted of a series of activities. Having first identified a problem within practice, students were asked to consider just how the problem or situation was framed. Frames of reference (i.e. the ways in which we see the world), were themselves considered sometimes to be problematic (Parker & Wiltshire 1995). We encouraged students to examine what assumptions, beliefs and values helped to shape their first impressions of the situation encountered. For instance, if a student argued that she approached the problem from an 'holistic perspective', she would be challenged to consider what this meant and to consider what the strengths and limitations of such a stance might be?

The Study Guide also invited students to consider the types of knowledge that they were employing in practice (Eraut 1990). The work of Eraut was chosen in preference to Carper (1978) because the latter was perceived to be both philosophical (how nurses see themselves as professionals) and ideological (advocating a particular nursing epistemology). Eraut (1990) describes practice knowledge as 'tacit' (i.e. not always consciously understood by practitioners) and a resource to be selectively drawn in different contexts. It followed, therefore, that the discovery of practice knowledge employed within a situation might both help define what was problematic, and suggest areas for future inquiry. For instance, the discharge of an elderly patient into the community involves process knowledge (about referrals, and about how the patient/family accommodate change). If the nurse has a deficit in this area, or is unsure of the usefulness of her current practice knowledge, then this may have contributed to the problem.

Problem-based learning also necessitated an understanding of the decision-making processes, both as a possible source of a problem and as a means to devise a solution. Elstein and Bordage's (1988) work was employed as the reference source in this area, and students were encouraged to complete exercises by which they examined their own process of decision making. Whilst it was anticipated that students might find terms like 'hypothesis formation' strange, we hoped that they would quickly learn that all people hypothesise, whether this is called a reflection, a 'hunch', or something else.

Finally, students were provided with illustrations of how formal elements of philosophy, theory and research might be incorporated into the problem analysis or a subsequent solution. Research, for instance, was examined in terms of the philosophical premises that informed its design and its possible utility in practice. Above and beyond questions about the validity or authenticity of research (which were discussed in the previous module), students were prompted to consider whether research recommendations were actionable within practice. Research had to pass a test of utility as well as credibility.

The learning materials were critically evaluated within the student and tutor postal questionnaire. Whilst the students perceived that all the materials were relevant, some were considered more accessible than others. Students were unaccustomed to analysing their decision making and tutors debated whether the recent promotion of reflection as a mode of learning had necessarily enhanced student confidence in this regard. It was noted that students might reflect about perceptions (theirs and others), and about beliefs, rather than about processes. The Study Guide employed a number of offprints (articles and papers) and several of these were considered quite difficult. For instance, frames of reference were explained with reference to the work of Foucault (1963). It became clear that some students were not sufficiently prepared for discussions about the ways in which reality (and therefore the problem) could be influenced by perception.

Paradoxically, the application of research, formal theory or philosophy to the problem was either surprisingly easy, or (as might be anticipated) extremely difficult. In some instances students had already identified a problem coincidentally when the module started, and they

Box 1 Stages of problem analysis (tutor facilitated)

Problem selection and containment	Tutor facilitate selection of manageable problems (i.e. ones which suggest opportunities for analysis within 15 weeks). Students encouraged not to expand the problem during analysis.
Student opening analysis of of problem using heuristic material.	Student encouraged not to worry about coherence/neatness of ideas at this stage. Tutor encourages, acknowledging first insights. Encourages student to idenfitfy any gaps/ inconsistencies in this 'first account'.
Student tries out account of problem with practice colleagues.	Student uses practice colleagues to verify some opening ideas and to see whether tutor questions prompt ideas for further inquiry. Student pursues these and consults with tutor as necessary.
Problem summary and ideas from new inquiries shared with study group	The study group act as a counter balance to local analysis of the problem, asking naive questions and challenging assumptions. Tutor facilitates debate.
Further cycles of inquiry and discussions in practice and study groups	Tutor encourages the student to record changes in thinking. Prompts student to summarise what is considered to be a more 'refined' problem analysis.
Working towards a resolution	Problem resolution in 15 weeks is not guaranteed, but tutor encourages several evaluations, e.g. in which area is the problem located (perhaps frames of reference?). Can theory/research or philosophy illuminate the problem or suggest a resolution?

then examined relevant research literature searching for what might help. Students who had formulated a problem clearly, quickly reported fewer problems identifying and then exploiting formal research or theory later on.

Problem-based learning tutorials

All the tutors employed to work with this module had previous experience of debating questions about nursing scholarship. Tutors within the programme are tasked with helping students to interpret materials, and to illustrate a critical attitude to what is read. They also promote an evaluation of the ways in which material might fit with practice. Tutors had not, however, previously been briefed upon the theory of problem-based learning.

For these reasons, additional guidance (in the form of tutorial exercise material and assignment and marking guidelines) were furnished to tutors. Tutors were cautioned that within the limitations of one module, it was unrealistic to expect that students would necessarily solve a clinical problem. On the contrary, judgements about student progress should be based upon student insights gained whilst tackling a chosen problem. In support of this, examples of incremental problem analysis were included as offprints to the Study Guide.

In practice, tutors worked through several stages of problem analysis with students (Box 1). The first of these was problem identification and containment. Problems were selected on the basis of whether they were amenable to some degree of practical analysis within the module time frame. The student's enthusiasm then had to be contained, so that he or she paused frequently enough to understand the problem solving process underway. Problem analysis appealed to students, and tutors worked hard to acknowledge students' interest, whilst reminding them that insights into the problem-based learning process offered longer term benefits as well.

The initial problem analysis was that of the student. Thereafter, however, consultation with work colleagues developed rapidly, and tutors were requested to appreciate an expanded analysis of the problem. At this stage, tutors used the tutorial group as critical reviewers of the analysis so far, and to suggest further lines of

Box 2 Examples of problems explored within *theorising in practice* PBL projects

Assessing cognitive capacity (elderly patients dealing with diabetic treatment)
Holistic approaches to assessing pain
Pressure sore prevention in non-ambulatory elderly patients
The therapeutic use of sedation in ICU
Securing beds for patients (Accident and Emergency)
Defining 'hazardous mobilisation' viz a viz dementia sufferers in hospital
Identifying unreported cardiac pain (cardiac care unit)
Teaching injection technique to patients/lay carers in the community
Managing nocturnal enuresis (boarding school)
Assessing breathlessness (respiratory care unit)
Supporting spouse involvement in hygiene care of patient at home

enquiry. Individual students then proceeded to interview, read, observe and question what they saw in clinical practice during the interval between tutorials. In this way, it was hoped that the problem analysis could be refined and tentative solutions gradually suggested.

Tutors reported four areas of anxiety during consultation with the Programme Director. The first concerned resisting the challenge to intervene and prematurely shape the problem for the student, when it was recognised that a summative assignment had to be completed by the student within 15 weeks. It was necessary to assure the tutor that we were committed to the assessment of the student's reasoning process, rather than a final problem solution. The second area of concern related to the diversity of student problem analyses underway within any one study group (see Box 2 for illustrations). Whilst the tutors were experienced in thinking conceptually and operating as facilitators of learning, there was a clear need to 'think into' the student's chosen problem on each occasion. Tutors were advised to strike a balance, between promoting individual and imaginative inquiry, and allowing the student to expand a problem analysis so that it was too unwieldy to be later summarised within course work.

The third area of concern was associated with the unexpected way in which the problem analysis engaged other clinical colleagues. Whilst students were encouraged to liaise with colleagues in the identification and analysis of a problem, we had not anticipated that the study materials would be read by quite so many other interested parties. Tutors found themselves cast as consultants to groups of practitioners and this required two key skills. The first was the ability to allocate equal time to each student (and their 'waiting in the wings' colleagues) and the second was to arrange tutorials that helped students to demonstrate their own incremental thinking en route to assessment.

Two tutors observed that problem-based learning appealed to the more confident student, and especially to those who faced current, sometimes distressing, problems at work. Students readily attested to the excitement of problem-based learning, but it was clear that the support of the tutor was key to their success. Because tutors limited the tutorial time allocated to different projects, many discussions spilled over into the one-to-one telephone tutorials that tutors offered. As one tutor put it:

> I'm used to telephone calls about assignments and mostly in the last weeks before the assignment. This time round the PBL students were talking non stop from week 3 on.

The net impact of problem-based learning upon tutor roles was positive. Whereas in more traditional modules they had been cast as critical commentators on theory, within this module they had a much more clearly focused role in the promotion of reasoning for action. Tutors helped the students to outline the problem that they faced, and in so doing to make it amenable to solution. Parallels were drawn with gymnastic exercises. As one student observed:

> My tutor did two things. First of all she quickly got a feel for what I could manage within the time frame and given my other responsibilities. It was like, don't try the triple back somersault if you don't have the resources, because you set the problem parameters when it comes to assessment. Second, she took care to help me frame up my

problem so I could get to the bottom of it. She didn't have a neat answer, so when it came to preparing for my assignment I had no qualms about explaining what I was trying to do.

Assessing problem analysis assignments

As with other distance-learning modules, detailed assignment and marking guidelines were prepared for the problem-based learning coursework. A formative assignment required students to discuss the identification of a problem with their tutor. Thereafter, students were required to submit a problem analysis for their summative assignment which demonstrated both a clarity of problem identification and insights into the process of analysis. All students were required to consider the integration of one formal theory element (research, theory or philosophy) as a part of the problem analysis. To assist tutors, different grades of award were characterised within the marking guidelines in terms of problem identification, indication of inquiry, discussion with others, and critical use of the frameworks (described above). Students were to be rewarded for imaginative thinking, especially where it was clear that this represented a change in the ways in which the student thought about day to day nursing care.

Table 1 summarises the grade results of the 69 students who completed problem-based learning summative assignments. The distribution of the results is skewed towards the A/B end of the assessment scale and it is possible that these results are influenced by the novelty factor of a new form of learning. A new assessment can prompt amongst examiners a greater appreciative response of the students' academic endeavours. Distance learning examiners, like other assessors may tire of the standard academic essay format. Because this is the first presentation of problem-based learning within the programme such results are probably not an incontrovertible vindication of learning materials and tutorial success per se. They do, however, appear to suggest that students have been able to understand the problem-based learning approach and to conduct an analysis of a clinical problem in a way that is comprehensible to others who were not intimately involved in that analysis (internal moderators and external examiners for instance).

Table 1 Distribution of grades amongst 69 students completing problem-based learning projects, *n* = number of scripts in that grade band

A (70–100%) 10
B (60–69%) 29
C (50–59%) 18
D (40–49%) 10
F (0–39%-fail) 2

Lessons for the future

It is easy to be evangelical about new educational approaches or theories within nursing. It is equally easy to make extravagant claims about an educational initiative. The profession has a history of welcoming and then distorting frameworks, be that the nursing process, reflection, or models of nursing care. We should, therefore, be cautious about the merits of problem-based learning, whether delivered 'on campus' or via distance learning. This said, the preliminary evaluation of student experience does, in our view, suggest a number of encouraging things about problem-based learning.

Firstly, it has been possible to write distance learning materials which describe and illustrate the process of problem identification, problem analysis and working towards a solution. Whilst such materials incorporate complex ideas about philosophy and practice, they were, with the help of tutors, accessible to the majority of students. Student evaluations attest to the excitement and interest that problem-based learning elicit, and because this is but one discrete part of a programme, it does not appear to have set up unrealistic expectations of change (Biley & Smith 1998). Whilst adopting a framework for problem analysis may be to constrain thinking in some regards, discussion of types of practice knowledge, frames of reference, decision-making processes, and the utilisation of formal theory has not seemed unduly intrusive. Both Chenoweth (1988) and Spouse (1998) refer to the need for a set of conceptual tools by which critical thinking might be mutually understood by students and tutors, and materials employed here appear to have remained firmly heuristic.

Because students used problem-based learning within a designated module (i.e. a module that students must pass), and we were unsure that they would feel confident with the strategy, it was important to offer alternative assignment options more familiar from previous academic work. Whilst this was an entirely ethical approach, involving a recognition of different styles of learning, it became clear that problem analysis could easily have filled the whole tutorial provision, and engaged tutors intensely in projects. We quickly learned that unless problem-based learning is set centre stage within the curriculum, it does require careful management. Whilst the freedom to explore is exhilarating, there is, too, a need to manage study time wisely.

Problem-based learning has been a useful way of synthesising students' learning across a longer period of study (in this case the first year of studies at Level 3). Whilst it is inappropriate to argue that it has enabled students to become evidence-based practitioners, it does appear to have offered embryonic insights into the problem of research utilisation. Previous module studies in research had focused (as many do in other curricula) upon research appreciation and critique. Problem-based learning poses additional questions about the utility of research findings and recommendations, and students found this aspect of their work at times challenging, but usually also worthwhile. As with other exercises in critical thinking, problem-based learning values the experience of learners and respects their cognitive and study skills. This appeared an important ingredient in the student selection of problem-based learning projects within this module, and the wide range of problems subsequently analysed.

Finally, there has been a significant and only dimly foreseen benefit for tutors and their relationship with distance learning materials. Whilst tutors have always been identified as critical to successful study within this mode of study, it has sometimes been difficult for such colleagues to feel central to learning, when the majority of what is taught arrives through the printed page. However, much as we might attest to the importance of facilitated learning, this can still seem insubstantial, especially within the limitations of a 15 week module. Problem-based learning clearly places the tutor at the centre of module study, and provides a clear focus for the sort of help needed (e.g. problem definition, containment, facilitating group discussions). Precisely because the author of learning materials cannot second guess the problems chosen, nor accommodate the twists and turns of the students' thinking, Tutors are a central influence in the experience of learning.

Conclusions

Tentatively, we conclude that problem-based learning is not an educational bridge too far within distance learning. On the contrary, the very organisation of tutors as facilitators of learning, supporting conceptually organised learning materials and students who work with their own clinical practice setting, appears to increase the potential benefits of this learning strategy. This project evaluation suggests that students can both succeed (in terms of assessment outcomes) and enjoy the problem-based learning strategy.

This acknowledged, three important issues need to be addressed before embarking upon problem-based learning within the distance learning mode. The first is that learning materials must present an accessible account of the process, incorporating the various sorts of knowledge, and an explanation of how to access sources of expertise. It is naïve to imagine that students will naturally respond to this strategy simply because they have been exposed to reflective learning approaches within their past studies. Tutors attested to the different sorts of analysis required within problem-based learning, emphasising its pragmatic nature.

Secondly, problem-based learning as a process within modular frameworks requires sensitive containment. It is important to start out with realistic goals about what the student might achieve within the module time span, and especially with regard to assessing a process rather than a problem solution. Distance learning places tutors in the role of guides to learning opportunities and choices, and despite the enthusiasm of students, there is sometimes a need to remember the merits of deductive as well as inductive approaches to learning. It is our view that excellent nurse education comprises inductive and deductive learning, in artful measure and often combined. We recommend

problem-based learning as a skills development component within the curriculum. Whilst it may be utilised in several areas of the syllabus, we are much more cautious about treating it as a wide ranging philosophy for nurse education.

Finally, it is important not to underestimate the learning curve that problem-based learning will involve for tutors (or other facilitators of learning). We have concluded that whilst we anticipated many of the needs of tutors by supplying tutorial exercises and assignment guidelines, the affective needs of students following this form of study are wide ranging and difficult to track over time. Students own their problems and invest enthusiasm, hope and hard work into the process of problem analysis. However unrealistic this may be, students frequently imagine that the tutor has understood their reasoning and can quickly anticipate their current debates about the problem. There is, therefore, merit in warning tutors about such expectations within briefings about the module.

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