



The University of Bradford Institutional Repository

<http://bradscholars.brad.ac.uk>

This work is made available online in accordance with publisher policies. Please refer to the repository record for this item and our Policy Document available from the repository home page for further information.

To see the final version of this work please visit the publisher's website. Available access to the published online version may require a subscription.

Link to original published version: [http://dx.doi.org/10.1016/S0260-6917\(02\)00166-1](http://dx.doi.org/10.1016/S0260-6917(02)00166-1)

Citation: Haith-Cooper, M. (2003) An exploration of tutors' experiences of facilitating problem-based learning. Part 2: Implications for the facilitation of problem-based learning. *Nurse Education Today* 23 (1) 65-75

Copyright statement: © 2003 Elsevier. Reproduced in accordance with the publisher's self-archiving policy.



An exploration of tutors' experiences of facilitating problem-based learning. Part 2—implications for the facilitation of problem based learning

This paper is the second of two parts exploring a study that was undertaken to investigate the role of the tutor in facilitating problem-based learning (PBL). The first part focussed on the methodological underpinnings of the study. This paper aims to focus on the findings of the study and their implications for the facilitation of PBL. Six essential themes emerged from the findings that described the facilitation role. The tutors believed that their facilitation role was essentially structured around the decision of when to intervene and how to intervene in the PBL process. Modelling and non-verbal communication were seen as essential strategies for the facilitator. Underpinning these decisions was the need to trust in the philosophy of PBL. However, within many of the themes, there was a divergence of opinion as to how the role should actually be undertaken. Despite this, these findings have implications for the future role of PBL facilitators in Health Professional Education.

Introduction

The way in which the tutor facilitates problem based learning (PBL) impacts on the success of the process and therefore students' learning (Andrews & Jones 1996). It is vital therefore to address the role of the lecturer as a PBL tutor. Due to a dearth of research and inconsistencies in the literature around facilitating PBL (Haith-Cooper 2000), an in depth study was undertaken examining established tutors experiences of effective facilitation. The philosophical and methodological processes of this study were explored in paper one. A wealth of information emerged from the six essential themes (see Fig. 1), which have implications for tutors undertaking PBL facilitation. This paper aims to examine some of the issues arising from the themes and their implications for the role of the tutor in facilitating PBL.

Intervening in the PBL process

The major theme to develop from the study concerned the decision of when and how to intervene in the PBL process. It is generally accepted that the tutor has a role in intervening in the process when there is an issue that needs addressing. What has become apparent is specific examples of such issues and how long to wait before intervening to deal with them. Previous literature has identified that PBL tutors found knowing when to intervene in the PBL process to be problematic (Kaufman & Holmes 1996; Neville 1999). Schmidt (1990) discussed the need for the tutor to learn to tolerate silence, rather than intervening to fill in the gaps in the students' discussions. Wilkerson and Maxwell (1988) highlighted the need to remain silent for prolonged periods.

Tutors in this study were more specific about their criteria for facilitator intervention. There was a general consensus that the role of the tutor is to intervene to deal with an issue. However, one should wait to intervene to allow the students time to work through the issue themselves. Some tutors specified how long they would wait. One tutor would wait 3–10 seconds, another 30 seconds to several minutes before intervening. Tutors believed that the single most important factor controlling when to intervene was time. Many tutors believed that timetabling issues prevented them from waiting as long as they would want before intervening. This has been found to be problematic when trying to integrate PBL into traditional curricula (Shanley & Kelly

1998). Then, there may be less time allocated for PBL tutorials and consequently, the tutor may not be able to wait as long to intervene should an issue arise. Barrows (1988) in his tutorial guide identified that the tutor should wait to intervene to see if students identify the issue themselves. Tutors' in the study supported this. Specifically, assessing the productivity of the discussion was felt to be a useful strategy. If the group brought together their different ideas and attempted to formulate the best alternative as a group, then this was considered productive and the tutor would wait to intervene in this situation. However, it was believed that one should intervene if problem-solving skills are not evident:

“ . . .if they are just going around in circles,
I think, I think, I think and on and on I
need to intervene.”
(tutor 12, nursing)

Tutors explored what they meant by “issue that needed dealing with”. They considered it as a disruption in one of the functions of the PBL group. These they classified into one of the following areas:

Unfocussed discussion

Some tutors felt that their role included intervening to refocus students' discussion should it digress from the learning issues. However, opinion varied as to when the appropriate moment was. Some tutors felt that they would intervene fairly quickly in this situation:

“It is less efficient for them to be talking
about things that are not in the overall
learning objectives of the programme”
(tutor 2, microbiology)

Others believed that it was important to wait to intervene until the students address something that is wildly off the subject and not relevant. However, when deciding to intervene for this reason, one tutor advised caution because of the assumption of the level that the students will start on when tackling an issue. It was felt that sometimes they had to return to a more basic level, a level that the tutor believed that they already knew. In this situation, the temptation is to intervene immediately whereas the students need time to address the issue properly.

To facilitate correct content

Previous literature has highlighted that the tutor has a role in intervening to ensure that the content of the students' discussions of the learning issues is accurate (Connolly & Seneque 1999; De Grave et al. 1999; Schmidt & Moust 1995). This was reflected in the study, tutors believing that their role included intervening to correct content. However, opinions varied as to whether incorrect content should always be corrected. Some tutors believed that they had a responsibility to ensure correct content was always being discussed for the sake of other students relying on the information to be correct. Others believed that they would intervene depending on the nature of the topic being discussed:

“ . . .if it was something that was very basic,

very fundamental to what I believe is the nurse's role, so if it was issues related things like communication, safety or pain control. . .”
(tutor 5, nursing)

This supports Michie's (1993) study of midwife teachers. Topics that were believed to be important to safety in midwifery practice were taught in a didactic way in order to impart safe practice. Similarly in PBL, some tutors ensured correct content for topics perceived to be important.

Some tutors felt the decision of whether to intervene to correct content depended on where in the curriculum the students were. If the tutor knew that the students had a future learning opportunity to realise their mistake, then intervention was not deemed necessary. In this situation, it was felt that the students would learn a valuable lesson in accepting facts without questioning them.

To facilitate the PBL process

Previous literature has highlighted the need to intervene if the students do not follow the PBL process (Andrews & Jones 1996; Katz 1995; Pansini-Murrell 1996). Tutors in this study went on to explore this issue in more depth. Again opinions varied as to when to intervene. Some tutors believed that following the process was fundamentally important to the success of PBL. Others felt that rigidly following the steps was not necessary as long as essential phases were followed. Some tutors felt that brainstorming prior knowledge was the most crucial part of the PBL process. If students did not identify gaps in their knowledge then they could not formulate appropriate learning issues:

“You have to know what you know to know what you need to know”
(tutor 8, physiotherapy)

However, other tutors were not concerned if the process was not followed properly: “some groups will say look we don't want any of that brainstorming garbage and I will say that is fine. . .”
(tutor 9, nursing)

To deal with problems with group dynamics

Intervening to deal with disruptions in the PBL group dynamics has been discussed in the previous literature (Barrows 1988; Kaufman & Holmes 1996; Wetzel 1996). However, although this issue has been highlighted, no specific detail has explored the issue. De Grave et al. (1998) developed a tutor intervention profile based on previous theory and research. One of the dimensions for intervening was to stimulate effective student interaction. However, no specific detail of diagnosing ineffective interaction was included. In this study, tutors assessed tutor interaction in a number of ways. It was believed to have broken down when discussion became chaotic with a number of conversations occurring at once. Like Kaufman and Holmes (1996), most tutors blamed disruption in group dynamics on the presence of dominant and quiet students within the group. Tutors would intervene to deal with such students. However, one tutor stressed caution with this suggesting that the tutor may believe

that some issue is negative when really it is part of the group forming process and is really a healthy part of group development. However, one issue highlighted was that students could be quiet for cultural reasons:

“ . . . People fall over themselves to let somebody else speak. . . or nobody else will speak because they are so afraid of being impolite or speaking out when their entire cultural development has been spent required listening and being very respectable . . . helping them shed some of their cultural baggage and realise that their participation is critical to success and they can be polite and respectable but still very active participants.”
(tutor 7, pharmacology)

How to intervene?

In this study, once the tutors had described reasons for intervening in the PBL process, they then went on to discuss specific ways in which they intervened to address issues in the group.

Questioning

Supporting previous literature, all the tutors felt that part of their facilitation role was to intervene using questions (De Grave et al. 1998; Happell 1998; Katz 1995; Wilkerson et al. 1992). Wording questions was felt to be vitally important. The use of the “Why” questions was discussed in detail. It was believed that the why question led to thought provoking inductive rather than directed deductive questions. Deeper probes were felt to be useful when information being discussed was too superficial. As Barrows (1988, p. 9) suggested, metacognitive questions were commonly mentioned. These encourage “thinking about thinking” helping students to consciously develop their decision making activities whilst increasing awareness of questions they should be asking themselves (Barrows 1988). Examples of metacognitive questions were highlighted to encourage the students to think more about the decision-making process leading to a certain action rather than merely what the action involves:

Deductive question “What antibiotics are most commonly used to treat this?”

Metacognitive question “What would you give and why would you choose that?”

(tutor 10, veterinary medicine)

As Barrows (1988) suggested process type questions were used for tactfully checking agreement and understanding between the students and highlighting wrong information:

“Oh that is an interesting perspective. I wonder, has anyone in the group got some

thoughts on this?”
(tutor 12, nursing)

Process questions were also used to deal with dominant students. This is a technique suggested by Katz (1995). Tutors discussed how they would handle the situation by questioning the quiet students:

“Is there anything the group could help you do to participate?”
(tutor 4 nursing)

Previous literature has discussed the use of questions to help students to make connections between concepts (Queens University 1998; Wilkerson & Hundert 1997). Many tutors suggested this in the study for occasions when students may dismiss an important issue as irrelevant. A situation arose where students were discussing a 74-year-old woman who had a cerebral vascular accident but dismissed the need to think about her sexuality because of her age. Questioning was used to help the students see that there was a connection between the two concepts.

Questions were also considered useful for widening paradigms. Katz (1995) discussed how questions could be used to relate learning content to wider social and political issues. One tutor gave an example when students were discussing chest pain. They focussed on myocardial infarction without considering other possible causes. Asking them to consider their own experiences of chest pain (usually indigestion) helped to widen their paradigm.

Previously, Wilkerson and Silver (1991) and Woods (1994) have raised concerns about tutors dominating sessions with content specific questions. In this study, concerns were raised about the number of questions asked. Excessive questioning was seen as detrimental to group discussion. An important role of the tutor was to decide on an appropriate number of questions are within the context of the issues being discussed. Questions that make the students think about each other's questions were more useful than continuous probing.

Giving information

Situations were identified when some tutors would intervene to provide the students with information:

“If it is something that I happen to know they need to get to the next step. A small isolated thing, I happen to know that they are not likely to encounter in the books. . .”
(tutor 11, medicine)

Another tutor regularly gave information to the students but justified it in that the students may know it but it gives the tutor a buzz. The philosophy of PBL involves the students being responsible for discovering their own knowledge (Creedy et al. 1992). This conflicts with the tutor providing any information to the students. Indeed previous literature stresses that the tutor should avoid giving information to the students that will increase their knowledge (Barrows 1988; Kaufman & Holmes

1996; Neville 1999). However, some writers believe that giving information is justified if an exception has been agreed (Queens University 1998) in some cases such as if the tutor feels that the information will assist the process without upsetting the value of self-study (Davis & Harden 1999). However, Dolmans and Schmidt (1994) feared that this would discourage students from searching their own existing knowledge and therefore identifying their own learning needs.

Surveying the group

This was considered useful to check understanding of issues that are raised. It involves stopping the process and asking each student individually his or her opinion on a certain issue:

“ . . . well ok lets just go around the table and if you had to put your money on something what do you think is going on in this case?”

(tutor 10, veterinary medicine)

It encourages participation by group members, facilitating them to express an opinion on the issue.

Describing

As Katz (1995) suggested, describing what the tutor sees is happening is considered useful. It allows the tutor to check out the accuracy of interpretation of events and provides cues for the students to pick up and discuss. One tutor discussed how she described what she was seeing when group processes had been disturbed:

“ . . . I have noticed that some people are not speaking and may have something that they want to say. . . They look like they are not happy with what is going on. . . ”

(tutor 8, physiotherapy)

She then requested those students to validate what she is saying. One tutor believed that discussing the non-contribution of a quiet student makes it easier for that student to speak. However, intervening in this situation could negatively influence some students due to a difference in learning styles. Quietness does not necessarily mean non-participation, it could indicate thinking before speaking rather than talking and thinking at the same time.

Reminding and reflecting

Tutors frequently reminded students of certain issues to steer them back onto the right track. Reminding students that their contribution would influence their final mark was seen as a way of encouraging quiet students to participate more. However, one tutor disagreed with this suggesting that this intervention could put undue pressure on quiet students. He suggested surveying the group instead.

Encouraging reflection is another important aspect of the PBL process, which is identified in the literature (Margetson 1994). Many tutors discussed how they use reflection to encourage the group to think about what they are doing. One student

had given wrong information to the group. A group reflection was used to learn from the experience. As suggested by Das et al. (1998), reflection was explicitly used to encourage an evaluation of the students' experience of PBL. This included discussing student contribution and group dynamics. If parts of the process did not go well, this could be addressed within the evaluation.

Modelling

Modelling was used to facilitate skill development in the students. This involves the tutor acting in a way to demonstrate to the students how they should perform within the tutorial (Barrows 1988). As Barrows suggested, modelling was used to encourage students to question each other in an effective way. However, modelling was also used in other ways such as critiquing other students' information. Modelling is also useful in encouraging group discussion of the process. By the tutor revealing what she is thinking, the students are encouraged to discuss their own thoughts. Specifically, one tutor talked about bringing quiet students into the discussion:

“. . .they began to do that themselves
they'd look at each other and say S you're
being very quiet today. . .”
(tutor 6, nursing)

Trusting the philosophy of PBL

To be a successful tutor one needs to reconsider personal beliefs about the teacher's role in education (Bligh 1995). Facilitation styles may be influenced by the belief of the tutor about effective learning (De Grave et al. 1999). Tutors felt that trusting that PBL works is essential to facilitate effectively. One must believe that students construct knowledge depending on their own prior knowledge and are therefore active participants in the learning process (Creedy et al. 1992). The tutor must therefore let the students actively participate.

Previous literature suggests that the tutor must create a student centred learning environment (Katz 1995; Maudsley 1999). To undertake this, suggestions were made by different tutors. One tutor always asked permission before intervening, for the group to feel ownership for the discussion. Also, ownership was encouraged by allowing students to control particular tasks:

“They decide on the timetable, whether to
come back or not to come back, that kind
of thing we finish when they want”
(tutor 5, nursing)

The tutors described the PBL tutorial environment in different ways including safe and supportive. One tutor described it as informal but academically challenging. The benefits of creating such an environment were to facilitate students to raise an opinion knowing that the opinion will be valued. One tutor felt that it was important to encourage students to discuss difficult issues:

“Because it is a supportive environment
they can talk about things like dealing
with difficult things. . .the first time they're

giving an intramuscular injection, what does it feel like to be the person doing that. . .so we are able to talk about things in a very supportive way.”
(tutor 1, nursing)

To create the ideal environment, it was felt to be important to provide positive feedback to the group. This was believed to be important even when the quality of the work was not good:

“I made the assumption that she had done as well as she could with the ability of that student so I praised her for the quality of the imaging that she found which was supportive for her and I could see that she was pleased that she had been praised.”
(tutor 3, radiography)

Schmidt and Moust (1995) found that developing an appropriate learning environment helped to build trust in the students. Believing in PBL means trusting the students are intrinsically motivated to go away and work (Kaufman 1994, Wilkerson & Hundert 1997). It was felt that the tutor has to trust the group to be motivated to go away and do the work. However, one tutor suggested that this trust has to go both ways:

“ . . .you want them to be honest with you when you are asking how much research work they have done for this, which books they have looked in and that sort of thing. . .And by the same token you know, you need to be honest with them about the material that you are working on and what you are hoping they are going to have achieved, how well they are doing. . .”
(tutor 3, radiography)

Equalling the power relationship between tutor and student has been discussed in the literature (Alavi 1995; Frost 1996; Katz 1995; Maudsley 1999). Being a successful PBL tutor involves relinquishing power and authority over the learning process (Frost 1995; Mayo et al. 1995). However, one tutor stressed that although you can try to give some control to the students, it is impossible to balance the power out equally as in the end the tutor has the power to pass and fail students. However, the word partnership was used. This includes accepting that the tutor is not an expert in everything and may learn from the students:

“I expect to learn as well because these are the people that are out in the field currently and I am not. . .I think that makes a good facilitator, one that admits that”
(tutor 6, nursing)

This supports Knowles et al. (1990) discussion about the role of the facilitator in adult education. He describes the facilitator as a continuing co-learner. More specifically in PBL the role of the tutor has been described as a learner with the students (Katz 1995; Mzalisi 1999).

Non-verbal communication

Although not discussed in the literature, many tutors believed that much of what happens in a PBL group is non-verbal. This was discussed within two contexts.

1) The tutor using non-verbal communication

It was believed that the most effective facilitators are those that keep quiet and use non-verbal communication to intervene instead of speaking:

“You may ask a question by just furrowing your brow instead of coming out and saying oh I am not sure. . .it’s much the same it’s a little less intrusive than actually saying it.”

(tutor 11, medicine)

However, over using non-verbal cues could be seen as a way of being judged by the tutor rather than as a means of reducing verbal intervention. Some tutors believed non-verbal communication should be avoided altogether to avoid the students focussing attention on the tutor instead of their peers. The tutor’s seating position was felt to be important. Positioning oneself at the head of the table suggests the tutor would take the lead in discussion. The position adopted within the chair was also felt to be influential. Sitting forward or back in the chair was felt to convey a message of wanting or not wanting to appear to be a part of what is being said.

2) Observing students’ non-verbal communication

Observing students’ non-verbal cues was considered important in informing the tutor of issues that remain unspoken. It was felt that students could be actively participating even when they are not actually speaking.

Changing facilitation style with group experience

Much is written about changing facilitation styles with group maturity (Dolmans & Schmidt 1994; Kalaian & Mullen 1996). Most tutors believed that facilitation styles needed to adapt to the PBL experience of the student groups. Barrows (1988) suggested modelling, coaching, and fading as a framework. The ability to follow the process becomes a learned behaviour and less intervention is required (Barrows 1988). Most tutors agreed that they play more of an active role with a novice group to help the students to understand how they are learning. One tutor described how he would intervene to explain the process:

“. . .the reason why I am asking you questions is to get you to think a little differently, or the reason I am asking you what you think may be going on in this situation is that I want you to hypothesise about all the variety of different things that

could be happening in this case and that is how you are going to learn.”
(tutor 4, nursing)

Like Barrows (1988), with increasing group experience, some tutors believed that the facilitator does “fade” or withdraw. This supports Heron’s (1989) work around facilitating small groups. With increasing exposure, students become more experienced in small group functioning. However, some tutors believed that still have a role in this situation:

“The experienced group I probably would give them much more rope with which to hang themselves. I’d allow them maybe to go down a tangent for longer before I would try to reign them in.”
(tutor 7, pharmacology)

Some tutors believed that they remain active in the process but facilitate in a way that focuses more on what the students are saying rather than stimulating them to say more:

“ . . . my role is more of a questioning and a critiquing and getting them to think about those things themselves. . . which will include the content but is more about critiquing their clinical reasoning than just content.”
(tutor 1, nursing)

However, some tutors did not believe that their facilitation styles changed at all with group experience:

“I think that I use similar techniques and strategies but I think I have a sufficient repertoire. I don’t change it on the location of the group in the curriculum, I change it on the group itself.”
(tutor 9, nursing)

Rather than changing style depending on the group’s maturity, it was a matter of working on the dynamics of the individual group. Kaufman and Holmes (1996) felt that difficult group dynamics could occur in any type of group not just novice groups. Many writers expressed this opinion (Haith-Cooper 2000; Wilkerson et al. 1992).

Discussion

This study aims to describe the essential structure of the experience to increase understanding about the meaning of facilitation. Although six essential themes were identified which tutors believed constructed the experience of facilitating, within these themes there was a divergence of opinion as to how the role should be undertaken. This provides information about the constructs of the role but added to the already

conflicting literature could be more confusing than helpful in developing effective facilitators. In many themes, the divergences of opinion appeared to highlight two types of facilitators. There were those who appeared to intervene more to facilitate the content and tended to correct misinformation. Others appeared to intervene more to ensure the PBL process is followed and the group functions effectively.

Phenomenology does not aim to develop theories about the meaning of experiences (Van Manen 1990) and therefore theoretical conclusions will not be drawn from this issue. However, from a philosophical perspective, it could inform future research. It is well documented that there are differences in facilitation styles displayed by PBL tutors. Connolly and Seneque (1999) found that some tutors allowed the students control over their groupwork where as others intervened more to ensure correct content was covered. Similarly, De Grave et al. (1999) believed that some tutors prefer to have expert knowledge to facilitate the content others prefer the ability to stimulate the learning process.

The PBL philosophy believes that students themselves construct knowledge, rather than it being transferred from one individual to another (Creedy et al. 1992). One could argue that content orientated tutors are simply imposing their knowledge on the students. Process orientated tutors are concentrating on creating effective group dynamics to facilitate students to learn for themselves. Tutors felt that fundamental to being an effective PBL tutor is the belief that the PBL process actually works. One could question whether focussing on the content, giving out information, and correcting misinformation occurs because of a lack of trust in the PBL process.

Using PBL assumes that students will develop transferable skills such as problem identification and problem solving skills (Creedy et al. 1992). During jump 2 of the PBL process (Schmidt 1983, Fig. 2), when defining the problem it is believed that the skill of problem identification will develop. If the process is not followed properly, then one could question whether the acquisition of this skill is being disrupted. This suggests that focussing on the process is important to ensure all the benefits of PBL are reaped. However, one benefit is the increased knowledge that students develop from the process. This knowledge will develop from discussing correct content.

The literature suggests that there must be a balance between content and process (Neville 1999). Schmidt and Moust (1995) referred to social (process) and cognitive (content) congruence as the essential qualities of the PBL tutor to assist students' learning. This suggests that elements of both tutor styles are important and finding the balance between the two will lead to effective facilitation. From their responses some tutors appeared to consider this. When facilitating the content, the perception of how important the content was influenced the decision to intervene. Some tutors identified when facilitating the process, they ensured elements of the PBL process were followed but not necessarily all the seven jumps. This appears to be a compromise between process and content. However, it is now important to examine how this compromise can be reached and what its effect is on the outcome of using PBL. Further research is warranted to explore this issue in more depth and whether tutor style actually affects the outcome of using PBL.

Conclusions and recommendations

This study aimed to collect preliminary data about facilitation; however, a larger scale study examining the experiences of tutors may help to develop some consistency in the facilitation role. The process versus content conflict has been explored with the recommendation for further research. This recommendation is applicable to other conflicts of opinion within the study. The themes developed from this study provide some “food for thought” for areas in which to prepare tutors for their role. They do not, however, provide a recipe for how to undertake the role. Further research is required to validate the themes developed through this study. Using multiple methods including observation techniques would allow the researcher to triangulate the data thus enriching the quality of the research (Koch 1994; Koch 1996). More time to return to the participants face to face rather than via e-mail would have also enhanced the research process (Annells 1996). Ultimately, the more knowledge gained about this role, the more skilled the PBL tutor can become.

One of the themes developed (trusting the philosophy of PBL) was believed to be fundamental in influencing the way that the tutor undertook the facilitation role. This suggests that central to tutor preparation for PBL is the need for education about the philosophy and then time to adapt pedagogical beliefs. The findings suggest that focussing on this would help tutors to facilitate PBL effectively.

References

- Alavi C 1995 *Problem-based Learning in a Health Sciences Curriculum*. Routledge, London
- Andrews M, Jones P 1996 Problem-based learning in an undergraduate nursing programme: a case study. *Journal of Advanced Nursing* 23: 357–365
- Annells M 1996 Hermeneutic phenomenology: philosophical perspectives and current use in nursing research. *Journal of Advanced Nursing* 23: 705–713
- Barrows H 1988 *The Tutorial Process*, Springfield, USA
- Bligh J 1995 Problem-based learning in medicine: an introduction. *Postgraduate Medical Journal* 71: 323–326
- Connolly C, Seneque M 1999 Evaluating problem-based learning in a multilingual student population. *Medical Education* 33: 738–744
- Creedy D, Horsfall J, Hand B 1992 Problem-based learning in nurse education: an Australian view. *Journal of Advanced Nursing* 17(6): 727–733
- Das M, Mpofu D, Dunn E, Lamphear J 1998 Self and tutor evaluations in problem-based learning tutorials: is there a relationship? *Medical Education* 32(4): 411–418
- Davis MH, Harden RM 1999 *Problem-based learning a practical guide*. *Medical Teacher* 21(2): 130–139
- De Grave W, Dolmans D, Van der Vleuten C 1998 Tutor intervention profile: reliability and validity. *Medical Education* 32(3): 262–268
- De Grave W, Dolmans D, Van der Vleuten C 1999 Profiles of effective tutors in problem-based learning: scaffolding student learning. *Medical Education* 33: 901–906
- Dolmans D, Schmidt H 1994 What drives the student in problem-based learning? *Medical Education* 28: 372–380
- Frost M 1996 An analysis of the scope and value of problem-based learning in the education of health care professionals. *Journal of Advanced Nursing* 24: 1047–1053

Haith-Cooper M 2000 Problem-based learning within health professional education. What is the role of the lecturer? A review of the literature. *Nurse Education Today* 20(4): 267–272

Happell B 1998 Problem based learning: providing hope for psychiatric nursing? *Nurse Education Today* 18(5): 362–367

Heron J 1989 *The Facilitator's Handbook*. Kogan Page, London

Kalaian HA, Mullen PB 1996 Exploratory factor analysis of students' ratings of a problem-based learning curriculum. *Academic Medicine* 71(4): 390–392

Katz G 1995 Facilitation. In: Alavi C (ed). *Problem-based Learning in a Health Sciences Curriculum*. Routledge, London, pp. 52–71

Kaufman DM, Holmes DB 1996 Tutoring in problem-based learning: perceptions of teachers and students. *Medical Education* 30(5): 371–377

Knowles MS et al. 1990 *Andragogy in Action*. Jossey Bass, Oxford

Koch T 1994 Establishing rigour in qualitative research: the decision trail. *Journal of Advanced Nursing* 19: 976–986

Koch T 1996 Implementation of a hermeneutic inquiry in nursing: philosophy, rigour and representation. *Journal of Advanced Nursing* 24: 174–184

Margetson D 1994 Current educational reform and the significance of problem based learning. *Studies in Higher Education* 19: 5–19

Maudsley G 1999 Roles and responsibilities of the problem based learning tutor in the undergraduate medical curriculum. *British Medical Journal* 318: 657–661

Mayo WP, Donnelly MB, Schwartz RW 1995 Characteristics of the ideal problem-based learning tutor in clinical medicine. *Evaluation and the Health Professions* 18(2): 124–136

Michie M 1993 Teaching styles and teaching strategies. An interview study of midwifery teachers. M.Ed Thesis, Edinburgh University

Mzalisi P 1999 The implementation of a community based education (CBE) and problem based learning (PBL) curriculum at the University of Transkei (Unitra). In: Conway J, Melville D, Williams A (eds). *Research and Development in Problem Based Learning*, vol. 5. The Australian Problem Based Learning Network, Australia, pp. 181–186

Neville A 1999 The problem-based learning tutor: teacher? facilitator? evaluator? *Medical Teacher* 21(4): 393–401

Pansini-Murrell J 1996 Incorporating problem-based learning: striving towards women-centred care. *British Journal of Midwifery* 4(9): 479–482

Queens University 1998 The role of the tutor. Available from: <http://meds.queensu.ca/medicine/pbl/pblhome6.htm> (1st October 1998)

Schmidt H 1983 Problem-based learning: rationale and description. *Medical Education* 17: 11–16

Schmidt H 1990 Educational aspects of problem-based learning. In: Jochems W (ed). *Aktiverend Onderwijs*. Delftse Universitaire Pers, Delft

Schmidt H, Moust J 1995 What makes a tutor effective? A structural-equations modelling approach to learning in problem-based curricula. *Academic Medicine* 70(8): 708–714

Shanley D, Kelly M 1998. Why problem-based learning? Available from: <http://www.odont.lu.se/projects/ADEE/shanley.html> (1 October 1998)

Van Manen M 1990 *Researching Lived Experience: Human science for an Action Sensitive Pedagogy*. Althouse, Ontario

Wetzel M 1996 Techniques in medical education: problem-based learning. *Postgraduate Medical Journal* 72: 474–477

Wilkerson L, Maxwell J 1988 A qualitative study of initial faculty tutors in a problem-based curriculum. *Journal of Medical Education* 63: 892–899

Wilkerson L, Hafler J, Liu P, Schmidt H, Van Der Arend A, Moust J, Koyx I, Boon L 1992 Influence of tutors' subject matter expertise on students' effort and achievement in problem-based learning. *Academic Medicine* 68: 784– 791

Wilkerson L, Hundert E 1997 Becoming a problem-based learning tutor: increasing self awareness through faculty development. In: Boud D, Feletti G (eds). *The Challenges of Problem-Based Learning*. Kogan Page, London

Wilkerson L, Silver M 1991 Effects of tutors with subject expertise on the problem based tutorial process. *Academic Medicine* 66: 298–300

Woods DR 1994 *Problem-Based Learning: How to Gain the Most from PBL?* Woods, Ontario