

An exploration of the strategic challenges of problem based learning (PBL) in medical education environment: A paradigm shift from traditional lectures

Srikumar Chakravarthi¹, H.S. Nagaraja² and John Paul Judson²

¹Dept. of Pathology, Faculty of Medicine, ²Dept. of Human Biology, Intra. Medical University, Malaysia.
srikumar_chakravarthi@imu.edu.my

Abstract

This study was done to explore the challenges of problem-based learning (PBL) in medical education and to propose a framework with implications for practice and learning. The paper uses a total of 24 undergraduate medical students divided into 3 groups who participated in the focus group discussions. A quantitative instrument was used as triangulation to gather data on 18 statements through Likert scale ratings. In addition, semi-structured interviews were conducted with 6 medical PBL facilitators. Quotes from the participants are used to support the key themes and issues that have emerged from the data. Quantitative data are used to support certain important issues. The successful development of PBL will depend on re-establishing the strategic direction of PBL within a certain context, evaluating the social and learning structures associated with power distribution, and providing non-routine rigorous educational systems to enhance learning.

Keywords: Problem Based Learning (PBL); medical education; focus group discussion; Malaysia.

Introduction

Much has been said about problem based learning (PBL) and the long-term benefits associated with it. But what does it take to ensure the successful implementation of PBL in medical education? As opposed to conventional teaching approaches PBL requires that the facilitator re-examine his/her role as content expert and reconsider the delivery power which takes place in class. In a PBL setting, the boundaries between the facilitator and student are also noticeably reduced. This provides opportunities for the student to be empowered in raising pertinent questions to challenge existing issues in relation to a PBL problem (Tucker *et al.*, 2002).

The shift in emphasis from traditional teaching to an emerging method like PBL is largely triggered by the changing external environment that is the 'global' workplace for which institutions are preparing their students. In recent years PBL has taken a greater prominence in tertiary education with curricula directed at independent and team learning (Creedy & Hand, 1995). However, PBL can be said to have an adverse effect on some students and even lecturers, who have to adopt a shift in their mindset, as students now need to explore rather than merely receive content knowledge. Similarly, lecturers now need to manage the learning process closely instead of simply giving information (Ponterotto *et al.*, 1995).

In many cases, both learners and teachers struggle to maintain equilibrium in managing PBL: on the one hand to maintain integrity in the PBL process and on the other teaching students sufficient techniques to help them juggle along (Podell & Soodak, 1993). As a consequence, frustration sets in and the level of resistance to PBL

intensifies. A case in point is the International Medical University, a medical university in Malaysia that introduced PBL in the mid 1990s and this approach has gone full swing today with good experiences by facilitators and students.

Against this backdrop, this paper discusses the various PBL challenges encountered at the International Medical University on both qualitative and quantitative data, the paper seeks to develop a number of conceptual and practical implications in relation to the teaching of PBL in tertiary education.

Background of the study

International Medical University is a pioneer private medical university in Malaysia which aims to provide quality education by creating a conducive and stimulating environment that encourages total development, continuous improvement and lifelong learning. Its vision is to prepare medical students for a future of dynamic change with relevant knowledge, lifelong skills, character and a thirst for continuous improvement. It is with this vision that the IMU constantly evaluates its teaching approaches to keep current the emerging needs of learners as well as clinical knowledge. PBL was first introduced to the IMU in the mid 1990s with several basic sciences and clinical subjects incorporated together.

What is problem-based learning?

PBL is framed upon the belief that learning is most effective when learners are actively involved and learn in a context where knowledge is to be used for a specific purpose. In other words, PBL is learning with a particular relevance to prior objectives set - as opposed to

conventional spoon-feeding learning, evident in lecturer-designed didactic settings (Walker *et al.*, 1996). Of importance to PBL is the dynamism among learners, where the emphasis is on the process experienced by the learner rather than that directed by the teacher. In addition PBL encourages purposeful learning linked to predetermined objectives. This is to ensure that the process of knowledge acquisition is effective and efficient (Kwan, 2000).

Essentially, PBL involves people working in small groups with someone usually the lecturer, to facilitate their learning and stimulate their thinking through interactive discussions. Typically, learners are given an exciting and challenging problem at the start of the session to brainstorm relevant issues and discuss possible solutions with real-world implications. They are also given the responsibility to take charge of their own learning by using the given problem as a guide to indicate the scope of what needs to be taught (Enger *et al.*, 2002). This prepares them to be effective, self-directed learners who are able to handle new problems as they face the future. Armed with the problem, learners are challenged to look for the relevant resources through a variety of investigative means. These may include the search for books, online material and sometimes content experts, usually the teachers. By doing this, they are able to acquire an integrative body of knowledge as well as a host of such skills as problem-solving, self-directed learning and group dynamics, necessary for personal growth and development (Wee & Kek, 2002).

Cognitive and behavioural perspectives of PBL

In recent years, PBL has been regarded as a "postmodern" approach to medical education, in that the notions of knowledge acquisition, learning and assessment are all integral to the learner's social context (Cowdroy, 1995). It now involves a variety of people who are required to identify problems, analyze and solve them independently to meet greater organisational demands (Alvarstein & Johannesen, 2001). This trend has considerable implications for PBL in tertiary education. In PBL, the process of learning is largely influenced by the contextual boundaries of structures and routines. The lecture hall is no longer used primarily as a knowledge-filling place. Knowledge gathering now requires a larger context, which takes place outside the lecture hall. The teacher-student relationship also takes on a different dimension. As such, any changes in these boundaries are likely to impinge upon the rate and degree to which individuals learn. In the same way, the causes and effects of these boundary changes are likely to influence the way individuals behave and act. Of pertinence is the parallelism between the way individuals think (cognition) and act (behaviour) and the stimulus-response theory of learning (Cowdroy, 1995). The emphasis here is that individuals are inclined to repeat a certain set of behavioural patterns that is tried and tested and avoid

any that is ambiguous and uncertain. PBL, being an emerging pedagogical paradigm in Malaysia has raised debates on why conventional teaching methods are no longer applicable to today's educational environment (Tucker *et al.*, 2002). The main concern seems to be every educator's fear of error-increase (as opposed to error-reduction) in response to learning.

The exploratory study

This study is exploratory in nature and seeks to provide a practical discussion on PBL, its processes and purposes. Specifically, the research problem that this study sought to investigate is: how can PBL be successfully implemented in medical education? In attempting to answer the research problem, this study was directed to the following research objectives:

- * To determine the difficulties and challenges of PBL faced by medical students
- * To identify a framework of PBL for medical education
- * To determine the strategies for the implementation of PBL in medical education.

Research methodology

A study was undertaken at the International Medical University, Malaysia to investigate the ups and downs of PBL as experienced by students and facilitators. The methodology utilized in this study was largely qualitative in nature involving focus groups and semi-structured interviews. For triangulation purposes questionnaire surveys were employed to collect some quantitative data to support the qualitative findings. There were 3 stages of data collection over a time period of 6 months:

- (1) The 1st stage involved focus group interviews involving 4 groups of 6 students each who had undertaken PBL for at least a semester (6 months).
- (2) The 2nd stage was a triangulation phase which involved a questionnaire sent out to the same students and
- (3) The 3rd stage involved semi-structured interviews with 6 lecturers who had facilitated PBL in at least 2 semesters in the university.

The lecturers who facilitated the PBL sessions were actually well trained PBL facilitators who have had experience in PBLs for at least 3 years in the university with regular updated training. The focus group technique was utilized as it is the most important and popular qualitative research tool in any exploratory study (Kanfer, 1900). Further this study investigated contemporary educational issues and aimed at understanding the underlying reasons and motivations of people's attitudes and behaviors in response to PBL. A focus group is a controlled group discussion used to gather preliminary information for a research project, to help develop questionnaire items for survey research, and to gather other preliminary qualitative data as a foundation for further study (Woolfolk & Hoy, 1990). As in the case of this study the focus group data helped shape the survey

questions used as triangulation in the 2nd stage, either to confirm or disconfirm what had been presented in the earlier qualitative data. Also the quantitative data served as an explanatory role in enhancing the validity and reliability of this qualitative study (Soodak & Podell, 1994).

In the final stage, semi-structured yet focused interviewing was employed as it appropriately allowed the researcher to probe deeply into the respondent's thoughts and feelings about issues they were most familiar with. The interviews also gave them an opportunity to be spontaneous in the way they reflected on issues they believed in (Perry, 1998).

Data analysis

There was a large amount of data collected from both the focus groups and interviews conducted for this study. Transcripts for the information collected were clearly typed out. As the data were qualitative in nature, a certain amount of subjective judgment was used in the analysis. For this research, a brief content analysis using the scissor-and-sort technique was utilized. A simple content analysis is appropriate if the purpose of using focus groups and interviews is for an in-depth exploration of a research topic about which little is known in a certain context (Zimmerman & Pons, 1998). The transcripts were scanned by the researcher for an overall feel of the qualitative data. The data scanning was done by 2 individual members of the research team with no individual bias based on a validated questionnaire survey. This was followed by comments for ideas, opinions or thoughts which were raised frequently by the participants or respondents. The common ideas were then categorized into themes. Grouping these ideas into themes or broad categories allowed the researcher to interpret the data adequately. This technique of analyzing qualitative data is known as the scissor-and-sort method and is the most common technique used by qualitative researchers (Woolfolk & Hoy, 1990).

Challenges of PBL encountered by tertiary students

According to the survey conducted, a high proportion of the students at International Medical University felt that PBL is a refreshing change from the routine of day-to-day learning in the lecture halls. In response to the question, 9.86% of them answered 'strongly agree' while 1.41% answered 'strongly disagree'. Further 16.9% of the students strongly agreed that age group is not a barrier in PBL compared with 8.45% who strongly disagreed. 12.3% of students 'agreed' and 14.6 'disagreed' in the analysis that was computed. Despite these findings, many students appear to struggle with the process of PBL, juggling between the role of information recipient (in conventional learning) and information investigator (in PBL). In the focus group discussions, which lasted about one to two hours per session, many students expressed negative sentiments about PBL. In the variety of views

generated, 3 key challenges that affect their learning process in PBL:

(1) Interpretation - Effective communication is essential to the PBL process. This involves inter-group and intra-group communication, which includes facilitator-and-student communication. Often, students complain that "the facilitator refused to give us the answers" and "we do not know where to go from here as we are groping in the dark". While the PBL facilitator's role is to guide and trigger their curiosity to explore an issue, many students have misinterpreted the action as being unhelpful and uncommunicative. In addition, in the intra-group communication, some of them are quick to quibble over the credibility of the research notes prepared by group members. Such misinterpretation defeats the purpose of collaborative learning, which is a key characteristic of PBL. Hence, the role of interpretation in the communication aspect of PBL is to help steer the course for learning. Any misinterpretation experienced between members appears will lead to a greater degree of individual learning, contrary to the intent of PBL (Podell & Soodak, 1993).

(2) Empowerment - After many years in the conventional learning mode, students are generally not ready for the empowerment of collaborative learning responsibility. This involves sourcing for information independently and sharing the findings with the group. To many, such empowerment is negative, as basic trust between members is usually not firmly established. For example, "PBL is too time-consuming and demanding. The facilitator doesn't teach and as a group, we are supposed to solve the problems by ourselves. But not all learners are active. Sometimes, we cannot trust each other to do their part. I would rather do my part in research. That's why I normally end up with a lot of work". Here, the empowerment to do investigative work is hindered by the diffusion of group dynamics. The success of PBL is the focus on the collectivism of mutual trust and confidence of each individual (Walker *et al.*, 1996).

(3) Motivation - One of the challenges that facilitators encounter in their PBL sessions is the negative mindset of the students. In their experience, students are generally not ready to undertake PBL, especially in an environment where conventional teaching approaches still predominate. As recounted by a lecturer in the interview, "It is difficult to convince students of the benefits of PBL. As a result, many of us [lecturers] have to put up with their negative attitude. It is very discouraging to hear student say, 'Give me the things to learn and I will learn only the things that will be tested.' Their attitude to PBL has affected their capacity to learn to a very extent". It is clear that PBL not only produces effects on the cognitive and behavioural processes, it has an impact on the motivational and affective issues as well. As such, the proper conditioning of the mind will have an effect on the acceptance of PBL.



A proposed PBL framework for medical education

Data generated from this exploratory research has led to the emergence of several key themes associated with the development of PBL in medical education. These themes are strategy, structure and systems, with wider implications for practice and learning. The framework is a response to the general sentiments of students at International Medical University: "At the moment, PBL is a chore as it doesn't really bring out the best in us. We need to fight deadlines and play different roles in our classes. It's difficult for us to switch from PBL to non-PBL mode. All these add up to stress". It is also hoped that this framework will provide some preliminary answers to medical universities that aim to create more PBL programmes to balance up their didactic courses.

Taking the 3 critical PBL challenges discussed earlier into consideration, this framework aims at instilling the right level of interpretation, empowerment and motivation for both students and teachers:

(1) Systems - At the fundamental level, the institution needs to create non-routine systems which will be built into the curricula to promote rigorous learning. Such systems should include the use of different assessment methods to ensure that each student takes due responsibility in research and the sharing of ideas. For instance, the use of peer tutoring coupled with peer assessment is a useful mechanism that will reduce the level of misinterpretation in the communication of knowledge. The rigor of learning can be ensured by the involvement of the teacher as the content expert when he/she interviews the student/s and provides content guidance to help enhance the level of interpretation (Greedy & Hand, 1995).

(2) Structure - In order to engage students in the right level of empowerment to do the work required for collaborative learning, relationship boundaries must be flexibly yet firmly established. For instance, the teacher must learn to provide sufficient rope to allow students to hang themselves. Teachers can do this by making themselves available for consultation outside class times and providing adequate content assistance to take the students exploration of issues to another level. A common deterrent to PBL is that facilitators are quick to turn away students by not offering content assistance. Sometimes, they confuse students further with more complex questions. As highlighted by a lecturer, "PBL facilitators need to know when to be firm and when to relax their rules. This is one strategy of ensuring a responsive class". The power distance in an inter-group and intra-group activity should allow room for negotiation in order to promote optimum learning (Walker *et al.*, 1996).

(3) Strategy - The underlying issue of motivation can be overcome by inculcating shared vision among individuals. It is through the adequate communication of PBL objectives to all levels of students and teachers that will motivate every individual to work towards a common goal. One of the reasons why students lose motivation in

PBL is that "We were not warned of the PBL approach. None of the subjects taught in the 1st year [at Temasek Engineering School] was PBL. When we came to the 2nd year, we suddenly had to deal with some PBL subjects and we were totally lost". The alignment of strategic goals is an essential step in bringing about the fundamental level of acceptance to the uncertainty and ambiguity that any new programme like PBL will entail. The pedagogical differences and the various expectations associated with PBL also need to be aligned with the overall readiness of the institution to provide an educational system contrary to the tried and tested approaches that are so entrenched in the system (Stonyer & Marshall, 2002).

The perceived outcomes of the PBL framework will be an accumulation of the cognitive and behavioral development of every learner depending on which aspect - systems, structure or strategy - appeals to them more. Ultimately, performance will be directly influenced by the learner's attitude and commitment to PBL (Tucker *et al.*, 2002).

Implications for practice

This section discusses the implementation strategies of PBL in tertiary education. According to the 8 lecturers interviewed, all agreed that "attitude of the students is still the most crucial". Many are also concerned that "the motivation to learn has to be intrinsic, be it PBL or non-PBL". How then can an educational system be ready for PBL, considering the fact that attitude and motivation are the two key factors which affect intrinsic learning?

Based on the data gathered, several important issues on the applications of the PBL framework have emerged:

(1) Systems - At this level, the institution needs to be mindful that in order to promote the self-directed learning required of PBL, the basic infrastructure to support such learning has to be in place. For instance, "We are always unsure where to get the relevant information to solve the PBL problem. It's dangerous when we share the wrong information. It will be a case of the blind leading the blind". As independent research is an important component of PBL, there should be sufficient useful online learning resources specially designed to guide students in their content exploration. In addition, training in research skills can be provided with the support of the librarians who will act as research coaches to students needing extra assistance. Peer action learning groups comprising students from other PBL groups or senior students can be established to help each other evaluate the credibility of the resources obtained. In order to facilitate learning further, appropriate information technology support needs to be provided. This will allow them to gain easy access to online resources and use the various software programs to prepare their assignments. Only then can students positively interpret their own learning process in PBL, one that is for the intrinsic value of extending their knowledge base (Soodak & Podell, 1994).



(2) Structure - 2 main areas that are crucial to the development of PBL are the social and learning structures experienced by both teachers and students (Walker *et al.*, 1996). The social structure is concerned with how the PBL facilitator relates to the learners as well as the relationship between learners. This is where the level of empowerment is enforced within the complexity of these relationships (Eldredge, 2004). From a practical perspective, timetabling is 1 method of enhancing the social structure. For instance, apart from the usual lessons timetabled as lectures, tutorials or laboratory sessions, certain slots could be used purely as resource times for students to be involved in discussions and reflections without the rigidity of abiding by a set of learning objectives. Similarly, non-compulsory consultation sessions can be timetabled for students to clarify content doubts with their PBL facilitators when necessary. This will provide a unique negotiation structure within the social structure to allow for flexibility in the learning process. However in other usual lessons where formal PBL processes take place, the lesson objectives need to be appropriately managed. Otherwise "Sometimes our PBL lessons are led astray by loose conversations as there isn't any proper lesson plan given by the facilitator". Hence, the transfer of knowledge and skills at the student's level will be greatly enhanced through the interplay of structures (Soodak & Podell, 1993).

(3) Strategy - The alignment of PBL objectives requires the cooperation of every individual within a department or institution. It concerns not only students but lecturers and administrators as well. Encouraging a strong buy-in on PBL as a useful pedagogical approach entails a strategic communication plan, right from making explicit its role in tertiary education to differences in learning expectations and outcomes. As such, a systems thinking approach will serve as a mindset enforcement to prepare teachers and students for a system of much-needed change. This involves the continuous communication of the institution's vision and mission. Any pursuit in motivating people is not an easy task. For example, "We [students] know PBL is good for us but we hate it as it takes too much out of us". As such, in order to alleviate such a situation there needs to constant engagement through dialogue, feedback and talks to identify the critical factors that hinder the progress of PBL and explore alternatives to address these issues. Gearing up the preparedness of people for something new takes time. It is only through the accumulation of experiences from a variety of factors that an ultimate shift in the mindset of people can be achieved (Stonyer & Marshall, 2002).

Implications for learning

The expected outcomes of PBL are many fold. Not only will the learner's knowledge base be expanded, his/her problem-solving skills will be taken to a higher level as well. PBL learners will be able to apply a variety

of skills learnt to a wider context when solving real-world problems. These skills will have a long-term impact on a person's professional development, helping him/her survive in the complexity of the working world and of life in general.

Actual learning takes place at the engagement point where the appropriate mindset and process intersect. It is when the dynamics of systems, structure and strategy come into play that PBL begins to be embraced and accepted by the learner. At the engagement point, learning is most active as learners challenge their ideas, analyze issues, evaluate options, decide on appropriate actions and appreciate their investigative abilities (Enger *et al.*, 2002). The level of cognitive engagement is further enhanced through group learning where a variety of worldviews and paradigms interact. In such an intellectual engagement learners begin to exercise their questioning and reflective power, the former to seek clarification through asking and the latter to understand their learning capacity through consolidating (Tucker & Herman, 2002). Questioning and reflection are two key characteristics of PBL that will take learning to the next level yet seldom manifested in common PBL settings like International Medical University. For instance, a facilitator who encountered difficulty soliciting useful responses in his PBL class commented, "Most of my students are not trained to ask good questions. Essentially, PBL is learning through a real-life problem and students are required to be curious about this problem. When they don't ask enough questions, the facilitators end up feeding them with answers. This defeats the purpose of PBL".

From the survey conducted, it was interesting to find that the students rated the importance of reflection and questioning rather highly. For the former, 12.68% responded "strongly agree" compared to 4.23% who responded "strongly disagree". As for the importance of questioning in PBL, 9.86% strongly agreed while 1.41% strongly disagreed. Although the majority of the students and lecturers interviewed mentioned that it was not the Malaysian educational culture to promote reflection and questioning traditionally many realized that these 2 are essential components of PBL.

The following is an example of the importance of questioning: "I found that I began to learn more if I kept asking 'why' and 'how' because I naturally wanted to find out more about the problem. I am more curious when I question more". Similarly, it is often heart-warming for lecturers to understand the student's learning process by reading their reflections periodically. This is apparent in a lecturer's experience: "I enjoy reading their [students'] reflections because it helps me to understand those more, especially what they are thinking and the difficulties they have encountered. But many students still do not know how to reflect well. They end up giving me a summary of their work. But those who have made an attempt tend to write good reflections that are insightful".

In summary, the predictive power of reflection and questioning cannot be overemphasized. At the critical engagement point of learning, the cognitive assimilation of new knowledge is often experienced by reflecting and questioning. Only then can further action in learning take place at the application level. The ultimate reward is the acquisition of lifelong and survival skills that will be of much needed for the changing environment (Ponterotto *et al.*, 1995).

Conclusions

This study addresses quite extensively the research problem of how PBL can be successfully implemented in medical education. However, it does not ignore the limitations of the 2 qualitative methods used. Although focus groups and interviews are easy to set up it is usually difficult for the researcher to moderate the process and even more difficult to interpret the data. The areas of reliability and validity in qualitative research are less likely to be obtained as completely as quantitative data. Problems associated with the interpretation of word choice used by the respondents, their unspoken thoughts, implied opinions and body language are perceived limitations (Podell & Soodak, 1993). Because such problems in interpretation exist, exploratory findings should be used as part of a preliminary study such as this research. Comparative studies and quantitative methods can be used as subsequent stages to test the findings from the focus groups and interviews used in this study.

With PBL so radically implemented in International Medical University, students continue to do well, in spite of feeling stretched in their juggling with different teaching approaches. Already, PBL within the university has taken on a variety of facets with changes constantly being implemented to enhance the process of learning. Still, students and perhaps teachers are left to feel that the PBL process is a case of teaching the technique of continual juggling with different expectations for the students, and the technique of playing different pedagogical roles for the lecturers. Even so, it is hoped that the proposed framework presented in this paper will provide a different perspective to the strategic challenges posed by PBL during the shift away from lecture based learning.

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