

THE CHALLENGES FACED IN A PROBLEM-BASED LEARNING APPROACH TO LEARNING AND TEACHING IN TEMASEK BUSINESS SCHOOL

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We live in a world of exciting changes and challenges. The challenges facing those who are implementing Problem-based Learning (PBL) in teaching and learning are as diverse as they are complex. They range from people and resource issues to organizational matters.

This paper looks at some of the challenges faced in the Problem-based Learning approach to learning and teaching in the School of Business in Temasek Polytechnic. It uses the results of a survey to report on tutors' experiences in implementing Problem-based Learning in their classes, discovering issues tutors face in its implementation in the subject or subjects they teach, and how they resolve these issues. The paper ends with some recommendations that could be considered by those planning to implement Problem-based Learning in teaching and learning.

INTRODUCTION

There are endless permutations and combinations of design variables in Problem-based Learning (Barrows, 1986; Kaufman, 2001). There can be a combination of teaching strategies that addresses challenges or problematic situations in a particular context. The situation can be multi-faceted, and the discussions are conducted in small groups where students are expected to participate actively in their learning. The diversity in the Problem-based Learning approach to learning and teaching can add to the difficulties, issues and challenges in both areas. These issues and challenges will then need to be addressed by institutions attempting to implement Problem-based Learning according to their unique situations. This paper describes the particular issues and challenges faced by staff in Temasek Polytechnic's Business School. In particular, the change of lecturers' mindsets, the greater demands on staff and resources,

and the unique cultural and political context of institutions have been identified by researchers and writers as heavily influencing the experience of Problem-based Learning by teachers, and its effectiveness.

CHANGE OF MINDSETS AND RESISTANCE TO CHANGE

The implementation of any new model of curriculum delivery (Problem-based Learning included) constitutes educational change. People can see change as additional work with no additional benefit. An adjustment period is required when changing the curriculum, which can sometimes be a genuinely life-changing experience. Knowledge of what to expect and how to adjust may be necessary to allay any fears. Aldred, Aldred, Walsh and Dick (1997) emphasized the point when they mentioned that persuading colleagues to implement or become involved in Problem-based Learning was felt to be a difficult task, involving questioning of long-held beliefs about teaching and learning. Overcoming resistance to Problem-based Learning in some departments might be a slow process. They also noted that people who did not believe in the whole process would nevertheless be tutoring, which was worrying. There seems to be a fundamental fear and lack of confidence among some tutors, who feel they do not know enough about the problem. Such people are resistant, and it takes a huge mind shift for them to rethink their teaching.

The author initially had a similar experience with his colleagues. When it was suggested that Problem-based Learning should be considered as an approach to education, an immediate response was that it placed too great a demand on resources, and that the lecture method of content delivery was a viable and efficient one – particularly when the cohort to be taught was large (for example, over a thousand students).

If tutors come from a teaching mode of using lectures and discussion, much work is required in changing the curriculum to Problem-based Learning. Each PBL project requires between 120 and 160 hours to construct, field-test, and revise (Bridges, 1992). Faculty members do not want to do the added work associated with changing the curriculum (Aspy *et al.*, 1993).

Given that the pressures on (and expectations of) tutors can be very high, it is understandable that they may show resistance, especially when a change of mindset and teaching culture is required. In the author's opinion, tutors need to be convinced and committed to the process and have a clear vision as to why it is the most appropriate means of learning and teaching for that subject or course. Otherwise, only lip service will be given to it and students may not reap the advantages which should follow from this approach to teaching and learning. The author agrees with Delafuente, Munyer, Angaran, and Doering (1994) and Vernon (1995) that there are varied factors which have contributed to tutor resistance. These factors may include the time demands placed upon faculty in assessing student learning, the preparation required for course materials, and the reduction in coverage of the course material which may be needed due to the relative "inefficiency" of PBL in delivering factual content.

When change is in motion, stress levels tend to increase. Changes and problems are likely to arise during transition from a more traditional programme to Problem-based Learning. Barrows & Tamblyn (1980) maintain that during such a transition, the school is in a "double-

demand system in which syllabi, books ... and almost anything may be wanted at the same time.”

This situation of increased stress in the author’s view should not be allowed to continue for long. The author agrees with Davis (1991), who notes that "...accepting that stress and suffering are an inevitable consequence of change ... does not imply that efforts should not be made to identify and reduce the effects of stress while achieving change".

Fullan (1991) outlines the types of factors associated with successful educational change, as well as factors which may work against innovation. Adverse factors include a lack of shared meaning, and professional development which is “ad hoc, discontinuous and unconnected to any plan for change”. Fullan emphasized the need to view change as a process, not an event. The point is made that true change can only come about if the change becomes institutionalized. A lack of institutional commitment to change may represent another barrier to implementation of PBL. These concerns, however, do not negate the benefits that the approach brings.

In addition, Shanley and Kelly (1994) agree with Fullan (1991) in stating that particularly when curricula are shared across many faculties, the shift to PBL may be too radical a change and faculty members are not prepared to accept it. They mention especially a dental curriculum which is shared with medical and science faculties. They see lectures to large groups as being cost-effective and providing more time for staff research. Shanley and Kelly also noted that the scientific evidence to support PBL rather than traditional methods is not strong and may be insufficient, for many people, to justify the inconvenience of changing to a different education system. Besides a change of mind sets and resistance to change on the part of tutors, another issue that needs to be addressed is the greater demands on staff and resources; and this cannot be easily answered.

GREATER DEMANDS ON STAFF AND RESOURCES

In a landmark work on Problem-based Learning, Barrows & Tamblyn (1980) acknowledge a number of problems that might affect the transition from a traditional programme to PBL. They agreed with writers already mentioned in cautioning that the things that need to be anticipated and dealt with are the demands made on staff time, competition for scarce resources, and the stress related to interdependence among members of staff. They highlighted the need to release Problem-based Learning staff from traditional teaching responsibilities in order that the transition is made easier for them.

According to Albanese & Mitchell (1993), Problem-based Learning required 22% more time than the more traditional mode of teaching: a 98-week lecture course required 120 weeks using PBL. When tutors consider the time per week in preparation for teaching problems, in comparison to presenting lectures, they may notice that it takes more time. Albanese & Mitchell (1993), found that instead of 8.6 hours a week primarily preparing lectures, faculty spent 20.6 hours a week primarily in groups with students.

More tutors would be required to teach the same content in a Problem-based Learning curriculum. If the class size is less than 40 students, the faculty effort in teaching PBL is

comparable to conventional teaching (Albanese & Mitchell, 1993). This factor of taking more time to teach the same amount of content would probably be a great hindrance in the minds of those who are contemplating the implementation of PBL in their curriculum. The author feels that tutors who see the work of a tutor as easy, so that they can “cruise along” in their work and not put in much effort in teaching, will probably be very uncomfortable with this approach to teaching and learning. It will seem that more work, time and effort is required for Problem-based Learning to proceed successfully.

On the other hand, Felder and Brent (1996) suggest that tutors do not need to spend very much time on in-class work in order to have a significant impact with it. Occasionally, work can be assigned to students who can work individually or in groups. Answers can then be collected from several randomly selected individuals or groups. One or two such exercises which take a total of 5-10 minutes can keep a class relatively attentive for an entire period. Felder and Brent also commented that much of what happens in most classes is neither teaching nor learning. Stenography is practised instead! Tutors recite their course notes and transcribe them on to the board, the students do their best to transcribe as much as they can into their notebooks, and the information flowing from one set of notes to the other does not pass through anyone's brain. Felder and Brent suggested that a more productive approach is to put substantial portions of the course notes – lengthy prose, detailed derivations, complex diagrams – in handouts or course packs, leaving gaps to be filled in and sprinkling questions and instructions like "Prove," "Justify," "Verify," "Explain" throughout the presentation. Only critically important and conceptually difficult parts of the notes should be dwelt on during class time. The students can then be expected to cover the rest of the notes for themselves.

Shanley and Kelly (1994) also comment that human and physical teaching resources are more compatible with existing systems of education. PBL is intensive in terms of resources and time, both for students and staff. Aldred *et. al.* (1997) noted that during the various phases of implementation, especially in relation to problem design, staff reported spending a large amount of time on Problem-based Learning during the week. A feeling that the available time was inadequate was also reported. However, people may also feel that the time is spent in a more creative way. Participants in the research conducted by Aldred *et. al.* (1997) commented, “It's good to think about the educational process rather than the content all the time.” The time investment was felt to be justifiable by most, and some staff reported making up for lost time during non-teaching periods.

Edens (2000) reports that the generative nature of the Problem-based Learning process cycle could sometimes be frustrating for the students, especially when information and resources were often needed at short notice. (Although that was frustrating, however, it was certainly typical of modern life!) It was impossible to plan for many events within the cycle. The resources required by Problem-based Learning may also put a great strain on the institution. For example, books need to be made available for a large cohort of students.

Little and Sauer (1991) observe that Problem-based Learning is viewed by educationists as tutor-intensive and requiring uncommon staff skills. Aldred *et. al.* (1997) highlighted specific tutor training needs related to working closely with groups, including problem design, advice about group dynamics and the development of personal skills,. It was felt that these needs were largely unmet at the institutional level. The training required by tutors should cover areas such as strategies to help tutors enhance the learning of their students in small groups,

group dynamics, and knowing how to behave in group situations – for example, how to respond when difficult questions are asked in a group situation. Faculty members who have taught using lectures and discussions may feel uncomfortable withholding information as they watch students struggle with problems. Faculty members need training to develop facilitator skills, otherwise they may be unsuccessful in Problem-based Learning (Bridges, 1992).

Process-type assessments can also be resource-intensive. Berkson (1993) notes that time constraints, poor student motivation, evaluation problems, concerns about student-directed learning and a lack of structure coupled with loss of faculty control were problems that can act as barriers to the implementation of Problem-based Learning.

Over and above the issue of staff and resources, each institution also needs to look at the unique cultural and political context of its organization, and its impact on strategies for implementation of Problem-based Learning.

CULTURAL AND POLITICAL CONTEXT

Certain situations could provide barriers to the implementation of strategies to help tutors enhance the learning of their students through the Problem-based Learning approach. Adams and Chen (1981) argued that “although the implementation strategy and the level at which the decision to implement is made depends on the culture and political context of the educational system, for any innovation to gain the right of passage, it is essential to recognize the greater relevant power”. They cautioned that the success of most educational innovations depended upon what is done at classroom level, because implementation depends on whether or not the teacher has direct and effective control over what happens at that level.

Barrows and Tamblyn (1980) make observations regarding teachers in basic science and clinical medical education who were not prepared to teach in Problem-based Learning programmes. The problems associated with the introduction of educational programmes requiring skills and expertise which teachers do not possess have been highlighted by Dalton (1981) and Gwele (1994). These researchers warned that such a state of affairs is threatening to the self-identity of the teacher and often evokes feelings of insecurity, which in turn affects implementation.

Another issue is that colleagues’ negative reactions to Problem-based Learning may be counter-productive to the successful implementation of the approach. Small groups of individuals who decide to use PBL techniques may face resistance or even resentment when the rest of the faculty continues to use traditional lecturing methods with the same students. There may be a lack of support, hostility or patronizing behaviour from their colleagues. Dalton (1981) contends that “change while fundamentally involving values and attitudes, needed support to sustain it”, in terms of both human and material resources. Staff perceptions of lack of support or unity often seem valid to them, and may determine the climate of the implementation process (Davis, 1991). Staff will need to have all the help they can get in the light of the challenges that they will face in the implementation of this approach.

SURVEY METHODOLOGY /QUESTIONNAIRE

A questionnaire was used to obtain information about the experiences of a representative number of tutors in Temasek Polytechnic's Business School when implementing Problem-based Learning in their classes. Respondents were also asked to identify the issues they faced, and to explain how they were resolved. The questionnaire was sent out to over 30 tutors, and 21 responded, giving a response rate of just over 70%.

There are approximately 150 tutors in the School, so the number of replies corresponds to a little over 10% of the total cohort. The study covered tutors from different disciplines and diploma courses: Hospitality Management, Marketing, Human Resource Management, Business Communications, Law and Management. However, it does not claim to be representative of the whole of Temasek Polytechnic. The range age of participants was from 30 to 45 years old. The status of those completing the questionnaire ranged from Section Head (of a particular diploma) to tutor level. The number of years of teaching at Temasek Polytechnic ranged from 1 to 8.

Both breadth of issues and depth of individual experiences needed to be captured, and so a mixture of qualitative and quantitative procedures was adopted. A survey was conducted in October 2000. The thirty tutors given the questionnaires had implemented PBL in the subject or subjects they taught, in three different diplomas and the department that teaches Business Communications. Some questions were deliberately left open-ended so as to elicit tutors' views and provide the opportunity for them to discuss their experiences. Using this type of question would hopefully elicit responses that might contain very useful information which would not be captured by using closed questions only. Great pains were also taken to ensure the anonymity of the tutors in the survey, so that more honest feedback could be obtained. For example, tutors were requested to hand in the survey questions by dropping them in the author's pigeonhole so that their identity would not be known. As Cohen and Manion (1995) mention, "...The essence of anonymity is that information provided by participants should in no way reveal their identity."

This paper seeks to use the results of the survey to increase understanding of the problems practitioners of PBL in Temasek Business School face, and how they go about solving the challenges of PBL implementation. Issues are identified and categorized, and possible causal relationships among these issues are also explored.

FINDINGS

The key findings of the study pertain to the impact of PBL on tutors and students, the level of support for tutors implementing PBL, and issues relating to facilitation and the active nature of learning in PBL. Each of these areas will now be considered in turn.

Impact of PBL on tutors and students

16 out of 21 tutors felt that the introduction of PBL positively or very positively affected their teaching. 12 of the 21 tutors felt that PBL had positively or very positively affected their feelings as a "valued" tutor, because students appreciated their advice and feedback more.

Tutors felt empowered to introduce more value-added scenarios in the assignments. There seemed to be more flexibility, enabling them to be stretched and to utilize their knowledge to the fullest. A tutor reported having mixed feelings initially, but subsequently the outcomes of PBL were shown positively during the students' period of industry-based work on the Student Internship Programme (SIP). As the tutor said, "...students' feedback was that we were not teaching at all. But the outcome of PBL surfaced during SIP."

On the other hand, another tutor felt "...somewhat frustrated at not being able to impart the 'expert knowledge' directly to the students." A tutor also commented that the students felt "... they (tutors) were confusing them when questions were thrown back at them" instead of answers. Little and Sauer (1991) noted this point when they mentioned the likelihood that those tutors who felt they were not valued often did not fully understand the extent of their role change.

The majority of tutors who felt PBL had a positive impact on students probably recognized that PBL can help in the learning of the students and positive results can bear fruit later, as seen in the students' SIP experience reported above.

Conversely, although this cannot be stated with certainty, it is likely that those tutors who taught well using lecture techniques – and who prized competence and efficiency – found the changes required by PBL hard to adjust to. Such tutors probably value themselves as subject "experts", and for these people the reality of implementing PBL is too much to accept. Their satisfaction from teaching is affected, and their feeling of being "valued" as tutors is threatened. This threat to their self-identity may evoke feelings of insecurity, which in turn affect implementation. These tutors seem to need to fully understand and internalize their role as facilitators, as required by PBL.

Support for tutors implementing PBL

Generally, 15 of the 21 tutors felt that the support from management at all levels had been substantial and encouraging, with resource persons helping out in the implementation of PBL. One tutor also commented that it "...seems that everyone is in PBL mode with top management support." A minority, however, felt that there was a lack of consolidated effort to implement PBL in the school.

Although the general feeling among tutors was that support from management is sufficient, more could be done. The approach in supporting staff could be more organized. For instance, a suggestion was made by a tutor that a pool of "gurus" should be set up for those who implement PBL to consult, using tutors who have experience of PBL implementation either in their own section or elsewhere in the School. The approach taken by the School was also felt to be rather diploma-centric – in other words, it was left to individual diplomas to implement PBL.

It was also felt that more could be done to recognize the effort put in by staff. For example, a tutor commented, "...PBL, although [its use] is encouraged, is often not recognized ... in terms of timetables and assessment." The comments by the tutor seem to concur with those of Barrows & Tamblyn (1980), who highlighted the need to release PBL staff from traditional teaching responsibilities in order to make the transition easier for them.

Facilitation and the active nature of learning in PBL

13 out of 21 tutors had students who expected them to provide information in response to their problems. Tutors had to adjust to this demand by students. The students were used to being “spoon-fed” with information and “model answers” in the past, and tutors found that old habits seemed to die hard. As one tutor said, “I guess they are used to having ‘model’ answers for everything.” Tutors also found that some students were not trained in independent learning, and therefore had difficulty with the PBL approach, which requires self-directed learning. Students were uncomfortable with the probing questions asked by the tutors in response to the questions they themselves had asked. Some tutors tried by trial and error to decide how much information to give to the students. Other tutors’ experiences were that initially students asked for direct assistance, but found instead that guidance from tutors involved question clarification. In the end this led to more independent learning on the part of the students. One tutor said that “eventually students [became] resigned to their fate of having to search for their own answers.” Another tutor commented that “... some students were also resourceful in finding information, and their questions to the tutors were specific.” Another comment was that “...with constructive facilitation, students will learn to set their own pace and reflect independently.” Finally, one should mention a remark by another tutor on the question of students’ learning the process skills and getting the necessary information: “... this will not be an issue in the near future, if PBL is introduced in the first and second year and across the whole discipline.”

All tutors commented that students’ dedication to self-directed learning was fairly high, high or very high. This seems to suggest that PBL is working, given that such learning by students is required (Barrows, 1984). It seems that guidance and greater facilitation from tutors enable students to be motivated to reflect independently, and encourages greater independent learning. It is worth noting the suggestions from tutors that early exposure (in Year 1 and 2) to PBL may help student learn the process skills, and so get the information they require for their learning.

8 out of 21 tutors mentioned problems relating to striking a balance between supporting learning and guiding students on the one hand, and student independent learning on the other. Although there is feedback via model answers, given at the end of the discussion sessions, thought processes are not explicitly modelled in a feedback session on performance. Tutors may therefore be unaware of whether students are really learning the issues required of them.

Furthermore, 6 out of 21 tutors reported having problems with the balance between allowing students to discuss issues freely and intervening to make sure that the critical issues were raised. They commented that students needed to take exams, and tutors needed to ensure that critical issues were raised to prepare them for those exams. When a group was not discussing the relevant issues it needed to be directed to the issues by the tutor. This intervention created a dilemma for tutors. As one said, “...students occasionally digress. Intervening may hamper the relaxed and informal sharing of ideas, but not doing so will compound their confusion.” Tutors had to resort to directing students back to their problem statement.

This issue of striking a balance between guiding students and encouraging student independent learning may need to be resolved by tutors individually. Perhaps the tutor could

suggest that students focus on the overall problem again to rediscover the learning issues, instead of intervening in the discussion. They would direct the discussion only as a very last resort, where students were totally unable to identify the appropriate learning issues.

CONCLUSION

Certain conditions enhance the effectiveness of PBL implementation and facilitation by academic staff. These range from a need for a commitment to the philosophy of PBL to a realistic acceptance of a role change, together with an understanding that the former “rewards” of teaching may change. The adoption of assessments that mirror the “real world” context, thus engaging students in demonstrating the complex capabilities and competencies of their proposed profession, needs also to be considered, as well as other factors which have been discussed above.

The following are some recommendations that could be considered in the implementation of PBL:

- Tutors who participate in PBL should be rewarded by giving recognition for writing problem scenarios and for small group teaching, just as they would be for lecturing. In other words, promotion, tenure, and salary increases should be linked with implementation of PBL activities.
- Tutors should read more about PBL and how to facilitate small group discussions. They should try to see the situation from the student's viewpoint.
- Tutors could create a forum for facilitators to discuss PBL issues as they arise.
- Assessment of students and evaluation of teaching must be made appropriate for the subject and teaching method. Regular qualitative feedback from students and staff could be sought and acted upon. Proper attention must be paid to the continued development of teaching materials used in PBL, to ensure its suitability and relevance to the subject and the profession. Tutors could also seek feedback more frequently from students.
- The resources required by PBL may put an increased strain on the institution; for example, books need to be made available for a large cohort of students. A possible solution for this issue might be that deadlines of various groups could be varied over the semester, with each group handing in its assignments at different times so that all the students need not use the resources over the same limited period.

The benefits of PBL are numerous and varied. They range from a more motivated self-directed learner to the acquisition of lifelong learning skills in solving problems and the processes that go with it, as discussed above. There are, however, challenges and issues facing those who are implementing PBL. The challenges or concerns discussed touched on many factors: the mindset of tutors towards change, the philosophy of tutors concerning teaching and learning, new skills, resources and requirements made of tutors, attitudes of students towards learning which tutors need to change, and issues related to assessment.

These challenges may seem very daunting at first, but rewards may await those who persevere and overcome them.

REFERENCES

- Adams, R.S. and Chen, D. (1981). *The Process of Educational Innovation: An International Perspective*. London: Kogan Page.
- Albanese, M. and Mitchell, S. (1993). PBL: A review of the literature on its outcomes and implementation issues. *Academic Medicine*, 68, 52-81.
- Aldred, S.E., Aldred, M.J., Walsh, L.J. and Dick, B. (1997). *The Direct and Indirect Costs of Implementing Problem-based Learning into Traditional Professional Courses within Universities*. Evaluations and Investigations Program, Higher Education Division, Department of Employment, Education, Training and Youth Affairs. Canberra: Australian Government Publishing Service.
Retrieved <http://www.dest.gov.au/archive/highered/eippubs/eip9709/front.htm>.
- Aspy, D.N., Aspy, C.B., and Quimby, P.M. (1993). What Doctors Can Teach Tutors about PBL. *Educational Leadership*, 50(7), 22-24.
- Barrows, H.S. (1984). A specific problem-based, self-directed learning method designed to teach medical problem-solving skills, and enhance knowledge retention and recall.. In H.G. Schmidt, and M.L. De Volder, (eds.), *Tutorials in Problem-based Learning: A New Direction in Teaching the Health Professions*, pp. 16-32. Maastricht: Van Gorcum.
- Barrows, H. (1986). A Taxonomy of PBL methods. *Medical Education*, 20, 481-486.
- Barrows, H.S. & Tamblyn, R.M. (1980). *Problem-based Learning: An Approach to Medical Education*. New York: Springer.
- Belson, W.A. (1986). *Validity in survey research*. Aldershot: Gower.
- Berkson, L. (1993). PBL: have the expectations been met? *Academic Medicine*, 68, 79-88.
- Bridges, E. M. (1992). *Problem based learning for administrators*. Eugene, OR: ERIC Clearinghouse on Educational Management. (ERIC Document Reproduction Service No. ED 347 617)
- Cohen, L. and Manion, L. (1995). *Research methods in education*, 4th ed. London and New York: Routledge.
- Dalton, T.H. (1981). *The Challenge of Curriculum Innovation: A Study of Ideology and Practice*. London: Falmer Press.
- Davis, P.S. (1991). The meaning of change to individuals within a college of nurse education. *Journal of Advanced Nursing*, 16, 108-115.
- Department of Education and Training (UK) (1995, March). White paper on education and training. *Government Gazette*, 357(16312), 4-80.

- Delafuente, J. C., Munyer, T.O., Angaran, D.M. & Doering, H. (1994). A problem solving active learning course in pharmacotherapy. *American Journal of Pharmaceutical Education*, 85(1), 61-64.
- Edens, K.M. (2000). Preparing Problem Solvers for the 21st century through PBL. Department of Educational Psychology, University of South Carolina. *College Teaching*, 48(2), 55.
- Felder, R.M. and Brent, R. (1996). Navigating the bumpy road to student-centred instruction. *College Teaching*, 44 43-47.
- Fullan, M. (1991). *The New Meaning of Educational Change*. London: Cassell.
- Gwele, N.S. (1994). *The process of change in nursing education in South Africa*. PhD dissertation, University of Natal, Durban, South Africa.
- Kaufman, D. (2001). Tutoring in PBL: A Conceptual Approach. *Canadian Association for Medical Education (CAME/ACEM) Newsletter*, 7(1). Retrieved: <http://www.came-acem.ca/Newsletters/IndexV7N1-Tutor.doc>
- Little, S.E and Sauer, C. (1991). Organizational and Institutional Impediments to a Problem-based Approach. In D. Boud, and G. Feletti, (eds.), *The Challenge of PBL*. London: Kogan Page.
- Shanley, D.B. and Kelly, M. (1994). *Why PBL?* School of Dental Sciences, Trinity College, Dublin, in ADEE 20th Meeting.
Retrieved: <http://www.odont.lu.se/projects/ADEE/shanley.html>.
- Vernon, D.T. (1995). Attitudes and opinions of faculty tutors about PBL. *Academic Medicine*, 70(3), 216-223.