

Encouraging Learning How to Fish: An Uphill but Worthwhile Battle

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Abstract

Introduction: Encouraging teaching practices such as problem-based learning (PBL) amongst undergraduate students within a lecture-based, system-based integrated curriculum is a challenge. Students are apprehensive about developing an organised framework for acquiring knowledge while lecturers are required to reframe their views on the educational process and their role as educators. **Materials and Methods:** Lecturers and students in the Phase (Year) II programme were asked to fill questionnaires following the second and fourth PBL cases. The two sets of survey responses were compared to see whether the students' and teachers' perceptions had changed over the 5-month period. **Results:** Students' responses from both surveys (1 and 2) were similar in that a majority agreed that the PBL tutorials had encouraged the seeking of information (66% and 67%, respectively), had improved understanding (57% and 56%), integration (65% and 70%) and application (50% and 64%) of knowledge. However, the views given in the form of written comments, following their positive responses, were somewhat contradictory. A large number of students (38% and 40%) faced difficulties in getting involved in discussions during the PBL tutorial and a majority (73% and 82%) preferred the normal subject-based tutorials. The reasons given by approximately 20% of the students were that the subject-based tutorials were more efficient for obtaining information and/or that the information had been pre-selected by the lecturers. More than 80% of the lecturers (in both surveys) perceived that the students had identified the appropriate learning objectives and covered the subject matter. The percentage of lecturers who agreed that PBL tutorials encouraged rapport and teamwork amongst students had increased in the second survey, from 70% to 92% and 55% to 83% respectively. **Conclusion:** Implementing PBL is not simply a matter of developing new teaching materials and new effective ways of presenting them. It requires a paradigm shift, a change in the roles of students and teachers, and time.

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Introduction

The objective of any curriculum, planned and implemented for a given course, is to achieve certain learning outcomes deemed required for a certain profession. How much of each of these learning outcomes is achieved depends on the learning tasks provided, the quality of instruction given and the resources available. All these being equal within an institution, the level of learning outcomes achieved by the students then depend on their cognitive entry behaviour and affective characteristics.¹ With the introduction of PBL approach, the learning outcome is also influenced by the quality of facilitation by the facilitators.

The diversity of problem-based learning (PBL) approach in teaching and learning, and the variety in which the PBL approach is implemented, is evident in the degree to which

it provides effective learning in a variety of contexts and disciplines.^{2,3} It is well accepted that PBL promotes active learning in small groups. It is highly student-centred and fosters the development of individual and group accountability in learning, as well as the development of independent, self-directed, lifelong learning skills.

Thus, when an established faculty, like the Faculty of Medicine of the University of Malaya, decided to introduce PBL into their New Integrated Curriculum (NIC),⁴⁻⁶ its effects on the teaching staff and students had to be considered. Encouraging teaching practices such as PBL amongst undergraduate students within a lecture-based, system-based integrated curriculum is a challenge. While moving towards the implementation of PBL, one of the greatest challenges faced is the changing of attitude in teaching and learning. Students may fail to see the

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advantages of experiential learning and are apprehensive about developing an organised framework for acquiring knowledge. They have always been told what and how much to learn. Similarly, teachers share these fears. With the introduction of PBL, lecturers are required to reframe their fundamental beliefs in the teaching and learning processes, and most importantly, their role as educators.^{2,7,8}

The change in beliefs mentioned above is not usually achieved spontaneously but has to go through a series of personal and philosophical struggles before these beliefs are transformed. It is because of this consideration that continuous monitoring needs to be carried out to gauge this change of emotion, which is the essence of this study. This paper describes the result of monitoring by the authors supporting the development and implementation of PBL tutorials within the NIC.

Materials and Methods

Initial Implementation Phase

At the Faculty of Medicine, University of Malaya, the PBL tutorials were scheduled before or simultaneously with the lectures at the beginning of the systems blocks in the Phase (Year) I and II programme. Back-up lectures were scheduled since teachers were apprehensive about the ability of the students to acquire sufficient content and depth of the topics covered in the PBL tutorials. PBL tutorials were introduced to the first batch of students following the NIC programme in Phase II (1999/2000 session) since faculty members doubted the abilities of the students in Phase I to be independent learners. PBL tutorials were only introduced to the Phase I students (second batch) in the 2000/2001 session. Both students and staff were trained in a workshop session regarding the principles and processes involved in PBL prior to the actual event.

Data Collection

The subjects of this study were the 190 Phase II medical students and 20 staff members who were involved as facilitators for the PBL tutorials. One facilitator was assigned to a tutorial group consisting of 9 to 10 students. Questionnaires containing open-ended questions and questions with choice answers were distributed to academic staff and students following the second and fourth PBL cases in the Phase II programme. Questionnaires filled by the students were collected by their tutors and returned to the authors. Data obtained from the two sets of survey responses were compared to see whether the students' and teachers' perception had changed over the 5-month period.

Results and Discussion

Response by Students

The response rates for the surveys amongst the students

were 84% (160/190) and 66% (126/190) following the second and the fourth cases, respectively. The reduced responses obtained for the second survey was because a few tutors had misplaced the pile of questionnaire responses. Table I shows the overall response for each statement. Students' responses from both surveys were somewhat similar although those obtained after the fourth case reveals some noteworthy shift of attitude. Many students indicated that there were aspects of PBL that they liked or they think were beneficial.

Following both the second and fourth cases, more than half (66% and 67%, respectively) of the students who had responded felt that PBL tutorials had encouraged the seeking of information. More than half (57% and 56%) also agreed that PBL tutorials had improved their understanding of the subject matter. After the second case, 65% of the responding students agreed that PBL tutorials helped them integrate their knowledge, whereas 70% held this opinion after the fourth case. Many students felt that they had learned to apply scientific knowledge to clinical cases through PBL. There was a 14% increase in response (from 50% to 64%) to this statement after the fourth case. However, the views given in the form of written comments, following their positive responses, were somewhat contradictory.

Less than half (34%) of the responding students indicated, after the second case, that they enjoyed the PBL tutorials although a higher percentage (42%) held this opinion after the fourth case. A fair number of students (38%) admitted that they experienced difficulties in getting involved in discussions during the PBL tutorial even after the fourth case (40%). This is cause for concern since one of the intended outcomes of PBL is to provide students with a friendly and non-threatening environment that encourages free discussion and projection of ideas. Dynamic discussion is also essential to group functioning. In order to improve the PBL process as used in this course, it is important to determine the reasons why this happened.

It is pertinent to mention here that prior to the systems block, the students were subjected to a period of 12 weeks of subject-based core teaching that included lectures and conventional subject-based tutorials. Thus, when asked about their preference, a majority (73% after the second case and 82% after the fourth case) preferred the normal subject-based tutorials consisting of 19 to 20 students and a content expert tutor per group. The reasons given by approximately 20% of the students were that the subject-based tutorials were more efficient for obtaining information and/or that the information had been pre-selected and condensed by the teachers who were more experienced. Another approximately 10% of the students commented that the subject-based tutorials were preferred because the discussions were more focused and only concentrated

TABLE I: STUDENTS' RESPONSES AFTER THE SECOND AND FOURTH PBL CASE

Statements	Case No.	Yes (%)	No (%)	Yes and No responses given (%)
1. I enjoyed the PBL tutorials	2 4	34 42	52 51	14 7
2. The brainstorming session was useful in:				
• determining learning objectives	2 4	65 60	31 35	4 5
• encouraging seeking of information	2 4	66 67	32 28	2 5
3. The discussion session				
• helped me to understand the subject matter	2 4	57 69	38 29	5 2
• helped me to integrate knowledge	2 4	65 70	31 29	4 1
• helped me apply scientific knowledge to the clinical cases	2 4	51 64	40 35	9 1
• improved rapport within the group	2 4	75 69	20 28	5 3
4. I had difficulties in getting involved in the discussions	2 4	38 42	59 56	3 2
5. My class spent more than 2 hours for the tutorial sessions.	2 4	31 20	68 80	1 1
6. My tutor was medically qualified	2 4	75 66	21 20	4 14
Facilitators in PBL tutorials should be medically qualified	2 4	79 77	18 17	3 6
7. I feel comfortable with facilitators who are not medically qualified	2 4	37 43	54 48	9 9
8. The tutor allowed free discussion by the group	2 4	89 94	9 4	2 2
9. The tutor attended to the needs of each member	2 4	65 67	28 25	7 8
10. The tutor gave positive feedback	2 4	82 76	10 17	8 7
11. The tutor helped my group to think critically and apply new information	2 4	70 78	24 17	6 5
12. The tutor helped my group to focus	2 4	74 83	19 15	7 2
13. The tutor gave all the answers	2 4	8 7	89 93	4 -
14. I preferred the normal tutorials rather than PBL tutorials	2 4	73 82	15 7	12 11

Footnote:

Students were asked to select Yes or No for their response to each statement, but some of them selected both choices, which is indicated in the fourth column of the table.

The figures represent responses to each statement as a percentage of the total response per statement. The response rate for each statement ranges from 79% to 100%.

After the second PBL case, 84.2% of the 190 questionnaires were returned. After the fourth PBL case, 66.3% of the 190 questionnaires were returned.

within the specific subject/discipline. Approximately 10% wanted both types of tutorial to be maintained. This group acknowledged the benefits of PBL but still felt insecure about the knowledge content acquired.

The students also gave comments freely regarding their facilitators, which was more exhaustive after the second case compared to after the fourth case. Approximately 12 students, after the second case, mentioned that the facilitators should not be too interfering or too passive. Ten students wanted the facilitators to give more guidance and encourage them to think critically and scientifically. Two students resented the fact that their previously informative and exciting tutor was no longer churning out information for them.

Views by Facilitators

The tutoring experience reported was largely positive, although only 12 facilitators returned the questionnaire after the fourth case compared to the full 20 responses received after the second case. After the second case, 80% of the responding facilitators agreed that they enjoyed the tutoring experience compared to 75% after the fourth case. Seventy per cent would volunteer as PBL facilitators. When asked whether medical qualification would be required, 30% after the second survey compared to 50% after the fourth survey felt that it was necessary. The additional comments given were that the medical background would help them give better guidance in terms of content and that the tutor guides although helpful were not sufficient for the non-medical facilitators. More than 80% of the facilitators perceived that the students had identified the appropriate learning objectives (95% in both surveys) and covered the subject matter (90% after the second case and 83% after the fourth case). The percentage of facilitators who agreed that PBL tutorials encouraged rapport and teamwork amongst students had increased in the second survey, from 70% to 92% and 55% to 83%, respectively.

Whether PBL tutorials help to improve critical thinking by the students was considered as a modality that is difficult to judge although the percentage of facilitators who agreed had increased from 35% to 58% by the second survey. In quite a few tutorial groups, there were usually 1 to 2 non-participating students. After the fourth case, 67% of the facilitators held that opinion as compared to 85% after the second case.

In general, the facilitators commented that with PBL tutorials the students were more proactive but they still tended to regurgitate information rather than discuss. The students tended to speak too softly and they had not prepared sufficiently.

Conclusion

Implementing PBL is not simply a matter of developing new teaching materials and new effective ways of presenting them. Encouraging PBL using clinically oriented cases is a challenge.

Teachers involved in the shift to PBL mode of teaching are faced with the need to re-examine many of the relationships that have characterised their teaching in the past. The shift also demands a change in the teaching role from the “expert” lecturer to a facilitator of learning. They may no longer be the source of information or the focus of the students’ attention. The facilitator’s role in PBL demands an ability to help students develop skills in critical thinking and problem solving/reasoning, self-directed learning and self-evaluation.⁹ Teachers are apprehensive about their group facilitating skills and the loss of opportunity to share their enthusiasm on their own subject of interest. This emotional transition may gradually be overcome with time, training and facilitating experience. Teachers who had taken students through the four PBL cases felt that students improved with time and were more proactive. However, they felt that more guidance and training as a facilitator are needed so that they can better motivate the passive students.

Although most students acknowledged the advantage of experiential and contextual learning, they resented the additional time required for self-study and were anxious about not obtaining enough relevant information. However, the students did acknowledge that they needed to change their attitude to become more self-reliant, to discuss rather than to regurgitate information during the discussion session, as well as to be more proactive and vocal.

It is too early to say whether the PBL approach will be well accepted in this institution. The PBL process will be further improved and accompanied by continuous monitoring; only then can the acceptance of this learning approach be determined.

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REFERENCES

1. Bloom B S, Engelhart M D, Furst E J, Hill W H, Krathwohl D R, editors. *Taxonomy of Educational Objectives: Handbook I. Cognitive Domain*, NY: McKay, 1956.
2. Woods D R. *Problem-based learning: How to gain the most from PBL*. Hamilton, Ontario: University of McMaster, 1994.
3. Albanese M A, Mitchell S. Problem-based learning: A review of literature on its outcomes and implementation issues. *Acad Med* 1993; 68:52-80.
4. Alhady S F A. *The medical curriculum: Review 1997*. Malaysia: Educational Curriculum Development Planning Committee, Faculty of Medicine, University of Malaya, 1997.
5. Azila N M A, Sim S M, Tan C P L, Alhady S F. Problem-based learning (PBL): making an impact in education. *J University Malaya Medical Centre* 1999; 4:94-98.
6. Azila N M A, Atiya, A S, Alhady, S F, Tan, N H, Sim, S M, Nah, S H, et al. Adaptive changes towards problem based learning in the New Integrated Curriculum (NIC) of the Medical Course at the University of Malaya. In: Marsh J, editor. *Implementing Problem-Based Learning. Proceedings from the 1st Asia-Pacific Conference on Problem-Based Learning*; 1999 Dec 9-11; Hong Kong. Hong Kong University, 2000: 323-31.
7. Barrows H, Tamblyn R. *Problem-based learning: an approach to medical education*. New York: Springer, 1980.
8. Woods D R. *Problem-based learning: Helping your students gain the most from PBL*. 3rd ed. Hamilton, Ontario: McMaster University, 1996.
9. Wilkinson J. *Learning to fish: Steps towards lifelong learning. Proceedings of the First Symposium on Teaching and Learning in Higher Education*; 2000 July 6-7; Singapore. Singapore: Centre for Development of Teaching and Learning, National University of Singapore, 2000:15-20.