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ORIGINAL ARTICLE

PROBLEM-BASED LEARNING AS PERCEIVED BY DENTAL STUDENTS IN UNIVERSITI SAINS MALAYSIA

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The implementation of problem-based learning started in 1969 and has spread since then throughout different parts of the world with variations in its implementation. In spite of its growth and advantages, there is continuing debate about its effectiveness over the conventional teaching learning methods. In the School of Dental Sciences (SDS), Universiti Sains Malaysia (USM), the Doctor of Dental Sciences (DDS) program follows a 5-year integrated curriculum. Basically the curriculum is problem-based and community oriented. This study was to explore the perception of DDS students about PBL sessions. This questionnaires-based cross sectional descriptive study were carried out on all the 110 students of the SDS who completed their second year of the course and participated in PBL sessions. Ninety five (86%) students responded to the questionnaires. Dental students found PBL session interesting and wanted to maintain PBL from the beginning of year 2 up to the end of year 3. Most students reported their participation in discussion during PBL sessions but the level of participation varied. Some of them worked hard to prepare themselves for discussion while others were relatively passive. PBL helped them with in-depth understanding of certain topics and link their basic science knowledge to clinical classes. They felt that guidance from subject specialists and well-prepared facilitators of the sessions were beneficial. The students believed that repetition of triggers from year to year discouraged their active search for learning issues. Majority of the students were undecided or disagreed about the availability of adequate learning resources Most of the students were undecided or disagreed about the availability of adequate learning resources for their self-study. Reviewing and renewing the PBL triggers, providing guidelines for searching for resource materials and briefing the students and facilitators about the philosophy and principles of PBL may make the PBL sessions more beneficial.

Key words *: Dental students, perception, problem-based learning session*

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Introduction

PBL challenges students to "learn to learn," working cooperatively in groups to seek solutions to real world problems. Since its implementation in McMaster University in 1969 it has spread throughout different parts of the world with variations of its implementation (1). In spite of its growth and advantages, there is continuing debate about its effectiveness over the conventional teaching learning methods. Berkson (2) concluded that the graduates of PBL are not distinguishable from their traditional counterparts. The experience of PBL can be stressful for students and faculty. There are few studies on attitude and opinion of participating faculty and students on PBL (3).

In the School of Dental Sciences, Universiti Sains Malaysia, DDS is a 5-year integrated program. Basically the curriculum adopts a problem-based and community-oriented learning approaches. The full 5 year program is divided into 3 phases.

Phase I- year one introduces the scientific

Table 1: Perception of students about problem-based learning sessions.

Statements on PBL sessions	**SA and A n (%)**	**Undecided n (%)**	**D and SD n (%)**	***p*-value**
PBL sessions are intersting	63 (66.3)	19 (20.0)	13 (13.7)	$p<0.001$
Attending PBL sessions are stressful	37 (38.9)	29 (30.5)	29 (30.5)	$p<0.05$
All students in PBL group participate in discussion	46 (48.4)	28 (29.5)	21 (22.1)	$p<0.01$
Some triggers are difficult	64 (67.4)	18 (18.9)	13 (13.7)	$p<0.001$
Some students work harder to prepare them than others to participate in PBL discussion	78 (82.1)	14 (14.7)	3 (3.2)	$p<0.001$
PBL sessions beneficial in achieving learning objectives	73 (76.8)	20 (21.1)	2 (2.1)	$p<0.001$
PBL allows in-depth understanding of the topics	70 (73.7)	20 (21.1)	5 (5.3)	$p<0.001$
PBL helps to link basic sciences knowledge to clinical appraisal skills (responses of 4th & 5th year student only)	43 (70.5)	14 (23.0)	4 (6.6)	$p<0.001$
PBL provides group interaction skills	74 (77.9)	13 (13.7)	8 (8.4)	$p<0.001$
Enough learning resources are available for PBL sessions	38 (40.0)	32 (33.7)	25 (26.3)	$p<0.05$
Utiliza learning resources available for PBL	69 (72.6)	16 (16.8)	10 (10.5)	$p<0.001$
Time allotted for each of the PBL session is enough	63 (66.3)	26 (27.4)	6 (6.3)	$p<0.001$
Tutors effectively facilitated the PBL sessions	40 (42.1)	38 (40.0)	17 (17.9)	$p<0.01$

SA = Strongly agree, A = Agree, D = Disagree and SD = Strongly disagree

basis of medical practice with emphasis on basic level knowledge of normal structure and function of human body. Teaching learning sessions are of traditional lectures, practical and tutorials.

Phase II- year two and three introduces different health events of human life from birth to old age with reference to integrated knowledge on common diseases. Teaching learning approaches in this phase includes lectures, practical, fixed learning modules, clinical clerkship and problem-based

Table 2: *Open comments of students on timing, facilitators and facilitation, achievement of learning objectives and strengths and weaknesses of Problem-based learning sessions*

Timing
1. Duration of session was enough
2. PBL sessions should be preceded by lecture on the same topic

Achievement
3. PBL guided them to study and emphasizes on certain topics
4. It helped them in-depth study on selected topic

Facilitators
5. PBL session facilitators should be subject specialist
6. Facilitators should prepare themselves before attending the sessions
7. Facilitators should be interactive
8. Achievements of the session depend on tutors guidance during the session

Triggers
9. Triggers can be given before the session for better preparation for discussion
10. Some triggers had too many points too discuss

Strengths
11. Group learning
12. It improved knowledge and communication skills

Weaknesses
13. Tutors did not guide as expected
14. Most students do not actively participate
15. Repetition of old triggers

learning sessions.

Phase III- year four and five consists of intensive clinical experiences through traditional and apprenticeship method of teaching learning.

In phase II, each PBL session is of two to three hour duration with a group of 14-16 students consisting of both medical and dental students of USM, who undergo a similar program from year 1 through to year 3. Tutors from all disciplines from both the Medical and Dental Schools act as facilitators for the sessions.

This study was intended to assess the opinion and attitude of DDS students on their PBL sessions.

Methodology

This cross sectional descriptive study was carried out on all the students of SDS who have completed their second year of the course and participated in PBL sessions. A total of 110 students (48 year 3, 32 year 4, and 30 year 5) were selected for the study.

Pre-tested questionnaires were distributed to the students at the beginning of lecture classes. Students were asked to complete and return the completed questionnaires to the Department of Medical Education or to one of the authors (Noorliza). The responses were anonymous. Questionnaires included questions on year of study, age, sex and year of starting and ending PBL sessions. Other than personal information opinion about different aspect of PBL like student interest and enthusiasm, personal satisfaction, tutors' role, availability of learning resources, class-room facilities, timing of sessions, problems triggers and strengths and weaknesses of the sessions were included in the questionnaires. Opinion questions were on 5-point Likert scale, 5 for "strongly agree" and 1 for "strongly disagree". Some open-ended questions were also included. For analysis responses

to statement were grouped into three, strongly agree and agree, undecided and disagree and strongly disagree. SPPS/PC statistical package was used to analyze the data. Chi-square test for goodness of fit was done to compare differences between responses in-terms of agree, undecided and disagree for each of the opinion statements.

Results

Out of 110 students 95 (86%) responded to the questions. Most of the respondents were female (81%). Their age ranged from 21 to 25 years. Majority (66%) of them (90) who responded the question were of the opinion that PBL should start from the beginning of year two and (46%) of them (58) who responded the question were of the opinion that it should continue in year three. Forty percent of the students did not response to the question on how long the PBL sessions should be conducted through their five-year course.

Students perceived that PBL was interesting to them and the time allotted for each of the PBL sessions was sufficient. In general they were of the opinion that PBL sessions are beneficial to them in achieving their learning objectives and acquiring in-depth understanding of the topic of study, linking basic science knowledge to clinical appraisal skills, and in developing group interaction skills. They agreed that they utilized the available resources and most students participated in discussion but some students in their group work harder than others to prepare themselves for the PBL discussion. Statistically insignificant differences in the number of responses were observed about the stressfulness in attending PBL sessions (40%) and availability of enough learning resources (40%). They found some of the triggers were difficult to discuss. Forty-two percent of the students were of the opinion that tutors effectively facilitated the sessions (Table 1).

Students were asked for their open comments on timing, classroom facilities, and achievement of learning objectives as well as strengths and weaknesses of PBL sessions. Students were very reluctant to comment. Only a few students commented and these are listed without weightage in Table 2.

Discussion

A statistically significant number of students found the PBL session to be an interesting method of learning. Some students agreed that attending PBL session is stressful while others disagreed. They found some of the triggers to be difficult. Nearly half of the students agreed that all the students participated in discussion as expected but others disagreed and were undecided. Moreover, they agreed that some students worked harder than others to prepare and participate in discussions. Perhaps, participation varies from group to group and comment came from the group in which all students did not participate in discussion. Sometimes students are shy or not sure about their point of discussion. It is found in other study also that tutors perceived their students were too shy and worried about giving incorrect information in front of tutors and are not interested in learning topics that they thought would not be examined (4). These may also be the reasons of non-participation in discussion found in this study.

Seventy seven percent of students felt that PBL sessions were beneficial in achieving their learning objectives and allowed in-depth understanding of the topic of learning. Seventy percent of the 4th and 5th year clinical students agreed that this method helped them to link basic sciences knowledge to their clinical appraisal skills. It also provided the opportunity to improve their group interaction skills. Woodward and Ferrier (5) reported that PBL track graduates feel their basic science preparation is not enough. But they perform as well as or even better than the conventional curricula students in clinical sciences (6). Seneviratne *et al.* (7) observed that PBL helped to improve communication skills and problem-solving skills of students.

Majority of the students were undecided or disagreed about the availability of adequate learning resources but most of the students willingly utilized the resources made available to them. They wanted lectures before PBL session on the same topic. They felt that the time allotted for each session is enough but there were too many discussion points for some of the triggers. Blumberg and Michael (8) in their study found that the PBL students use textbooks, journals and other books and have informal discussions with the faculty or peers. They also reported less use of cooperative lecture notes, course syllabi and personal lecture notes. PBL track students spend more time in the library than the conventional track students. May be in this study some of the students felt that the notes and other learning materials that are available to them through the tutors are the resources not the books and journals.

Although a statistically significant number of

students agreed that tutors facilitated the discussion session as expected, a large group of students disagreed or undecided. The disagreement was supported by their open comments. They wanted well-prepared and clinical tutors as facilitators for the PBL sessions. Students in this study may have felt that the tutors were resource persons for the sessions. Patel *et al*. (9) concluded that the PBL students might retain errors and misconceptions on clinical care problems because of non-expert tutors leaving errors uncorrected leading to misconceptions. Silver and Wilkerson (10) concluded that groups with expert tutors are less likely to engage in student-directed discussions and collaborative learning which is the principle of PBL. Perhaps an ideal solution for this issue is to train more 'experts' as PBL facilitators through regularly arranged faculty development programs on PBL concepts and principles.

Conclusion

PBL sessions conducted for the SDS students were enjoyable and had learning benefits. However, some interventions may help to improve the teaching learning processes. These strategies would include more regular briefing on philosophy and principles of PBL as well as the appropriate way of conduction of PBL sessions. Efforts at reviewing the triggers and the resource materials regularly by the review committee are also recommended.

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