PERCEPTION OF YEAR 1 AND YEAR 2 MEDICAL STUDENTS ON PROBLEM BASED LEARNING (PBL) IN FMHS, UNIMAS

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Submitted in partial fulfilment for the Degree of Bachelor of Medicine in the Faculty of Medicine and Health Sciences Universiti Malaysia Sarawak.

April, 2011
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Saya / I 2009-23714 KAMINI DEVI A/P R.SIVARAJAH (group leader)

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ABSTRACT

The Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, adopts Problem Based Learning (PBL) and lectures as the hybrid teaching-learning method in its medical curriculum. This study was carried out to investigate the perception of medical students on PBL in FMHS, UNIMAS. **Methods:** A questionnaire-based survey was conducted on 165 students of Year 1 and Year 2 medical students (Cohort 2009 and 2010) to explore their perception on PBL. The students’ perceptions on PBL were categorized into 4 themes: problem solving and self-directed learning aspects, collaborating as a group, the usage of learning resources, and the role of the facilitators. The factors affecting students’ learning and performance in PBL, and the disadvantages of PBL as perceived by the students were also explored by open-ended questions. **Results:** Most students have a good perception and positive attitude towards PBL and most of them agreed that PBL enhance their collaborative learning and team work skills. **Conclusion:** PBL was perceived as a beneficial learning method by the first and second year medical students as it enhances teamwork and communication skills.

**Keywords:** Problem Based Learning (PBL), students’ perception, medical education.
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CHAPTER 1

Introduction

Problem-based Learning (PBL) is any learning environment in which the problem drives the learning. The faculty of Medicine and Health Sciences, University Malaysia Sarawak (UNIMAS) has adopted PBL as a teaching–learning methodology in its undergraduate curriculum since its inception in 1996. The duration of undergraduate medical education is five years. A hybrid problem-based curriculum is the principal educational strategy in the first two years. The students are grouped into a number of 10-12 students, with a lecturer appointed as a facilitator.

The mode of implementation of PBL programmed in FMHS, UNIMAS follows the seven-step model in order to structure the student’s activities during PBL. According to Schmidt H. G. (1990), this model consists of clarifying vague phrases and concepts in the problem, defining the problem, analysing the problem on the basis of prior knowledge, arranging the proposed explanations, formulating learning objectives, trying to fill in the knowledge gaps by means of self study and reporting findings in the group.

The trigger or problem is a text-based case which is usually a paragraph or two, describing the chief complaints, physical findings, results of some investigations, and provisional diagnosis. As the students are working in a group, one student who has been chosen as the chairperson read the trigger out loud while others read along silently. This is to see what the
trigger is about and to note down the words and phrases that seem to be important to be able to understand the trigger.

A good medical dictionary and reference books are available in the PBL room. The scribe is also chosen who has to write the difficult terms and their clarification on the white board as the students contributed by looking up in the medical dictionary. The scribe then jots down the facts and ideas generated by the students. This is followed by a brainstorming or discussion session. A list of questions with “Why?, How?, What?, When?” pertaining to the problem given are generated. All the issues are written on the white board regardless of how odd, narrow or broad they may be. The next step is refining the issues into learning objectives or learning needs. The whole process is monitored by the facilitator to keep the students on track. This trigger introduction session is given two hours usually on the Monday mornings.

The students are to continue their learning by finding information from various resources such as textbooks, other library materials, articles, results of lab or field research, data sets, other electronically based resources, pamphlets from organizations, interviews with experts, museum exhibits etc. The process used for the collection of information to be able to discuss in depth with the group on the following Friday is regarded as self-directed learning (SDL).

With the acquired information from various sources the students meet again on Friday mornings for two hours. Students talk about what they have learnt, thus sharing with the group and teaching each other. The use of visual aids (e.g. anatomy models, bones, charts diagrams on the white board, transparencies) is encouraged. The formation is also critically analyzed and discussed. It is totally a student-centered discussion with the lecturer acting as a facilitator to
bring out the best from the group. At the end of each session the group summarizes the information and the facilitator gives feedback to the students regarding the group performance.

Maudsley (1999) mentioned that medical students in a medical curriculum should feel that problem based learning sessions work well for them. Students are expected to be able to discuss and generate learning objectives from the clinical scenario given to them as triggers with the help of a facilitator. They are also expected to know how to search for required information.

Currently, there is lack of information on the effectiveness of PBL that has been implemented in FMHS, UNIMAS. There is a need to explore how the medical students in the FMHS manage their participation in PBL sessions for the development of the PBL curriculum and good PBL practice in the faculty. This study on the students’ perceptions will provide a platform to primarily evaluate the PBL approach in Phase I curriculum. The objective of this study is to determine the perception on various aspects of PBL among medical students of Phase I curriculum, which are the Year 1 and Year 2 students.
CHAPTER 2
Literature Review

Studies related to PBL have been carried out worldwide. It is the most comprehensive and widely adapted approach that has been selected for the curriculum delivery model at many professional schools around the world (Putnam, 2001). It is first implemented in McMaster University in 1969 and has spread all over the world with variations of its implementation (Albanese & Mitchell 1993). It can be applied to all levels of learning across many different disciplines and profession. It helps students learn how to study and leads to sustainable learning (S. Mennin et al, 2003). Many variants of PBL have evolved during the past 30 years and yet its essential elements are still being used as in the model developed by Barrows, 1985. Over 80% of medical schools use the PBL methodology to teach students about clinical cases, either real or hypothetical (Vernon & Blake, 1993; Bridges & Hallinger, 1991).

According to Deretchin LF (1998), Problem-based learning is much favored by curriculum planners in new and more progressive medical schools. This is because PBL is very innovative as it is a new way of using clinical material to help students to learn. Moreover, PBL is also challenging because it requires the facilitator or lectures to use facilitating and supporting skills rather than didactic, directive ones. For the student, problem-based learning emphasizes the application of knowledge and skills to the solution of problems rather than the recall of facts. Compared to traditional lecture-based curriculum, students in a PBL curriculum are able to use greater number and variety of resources during the self study.
The model of PBL has been outlined as follows: Learning is student centered, it occurs in small groups, facilitator plays a vital role as a guide for the students, critical thinking problems are given before any study or preparation has occurred, and problems are used as a tools to achieve the required knowledge and the problem solving skills are needed to solve the problems. The fundamental objective of Problem Based Learning is to equip students with skills and information that will transfer from university to professional life. It is the intention that problem-based learning will instill in students life-long learning practices. A problem-based curriculum engages students in learning and reaching new levels of understanding (Cambourne, 1998.) One of the main components of PBL are self directed learning and students’ ability to investigate learning objectives. PBL graduates capability to deal with problems and to retrieve information is the index for lifelong learning (Shin et al, 1993; Wood, 2003). PBL creates a conducive environment for development and practice of self directed learning.

PBL curriculum also emphasizes the development of self-regulating skills. Rather than being passive recipients of information, students are expected to be actively involved. In PBL, students are encouraged to take substantial responsibility for their learning. Small group discussions stimulate independent and active learning. During a PBL group session, limited only by the boundaries of their prior knowledge, students try to clarify the issues being discussed. The issues that cannot be explained thoroughly are formulated as student-generated learning objectives which will guide the students during their independent and self directed learning.

During the searching phase of individual study, students are expected to refer to different learning resources and search for literature relevant to their learning issues (Van den Hurk et al, 1999). Compared to traditional learning method which is lecture-based curriculum, students in a
PBL curriculum use large variety of learning resources and this is made enhanced by current developments of technologies. The diversification of learning resources and their access routes had a huge impact on professional skills development. Due to the fact that medicine requires lifelong learning, it has become a crucial for students to discover learning resources on their own and to interpret their findings. The use of a variety of resources necessitates the processing of information through critical self-directed inquiry (Deretchin et al., 1998). The extensiveness of different learning resources used is an indicator of students' self-directed skill. The consultation of diverse information resources influences the depth and breadth of discussion of the group during reporting phase (Van den Hurk et al, 1999, 2001).

Many evidence also indicate that active participation in learning is more satisfying and leads to advanced retention and recall than passive transfer of information from the teacher to the student (Bransfort et al., 2000). Major and Palmar (2001) also agreed that students in PBL courses often report more satisfaction with their experiences than non PBL students. Moust, VanBerkel and Schmidth (2005) also noted that PBL has a positive effect on the process of learning.

Various researches have been conducted on conduct and effectiveness of PBL most in medicine field. The large variation in PBL practices makes the evaluation of its effectiveness difficult. Researches who have investigated PBL in medical schools have reached contradictory conclusions (Sachin & Yorek, 2009). Albanese and Mitchell (1993) reported that compared with conventional instruction, PBL, as suggested by the findings, is more nurturing and enjoyable; PBL graduates perform as well, and sometimes better, on clinical examinations. Vernon and Blake (1993) reported that PBL approaches were more effective in generating students' interest,
sustaining motivation and preparing students for clinical interaction with patient. Study by Beers (2005) demonstrated that there was no advantage in the use of PBL over more traditional approaches.

Lycke (2006) confirmed that there was lack of significant differences in medical knowledge although students in the PBL programme perceived students as more active contributors to group learning process and made use of a broader range of resources than students in the traditional programme. Other research findings on the different aspects of PBL are reported by various authors. Nandi PL et al (2000) reported that a combination of both the conventional and newer curriculum may provide the most effective training for undergraduate medical students. Morales-Mann and Kaitell (2001) reported from their study that the most frequently identified factors that influenced performance and learning in PBL were positive attitude and group effort. PBL produced clear benefits for students, such as increased autonomous learning, critical thinking, problem solving and communication.

Students learn most effectively when using a variety of information resources. Therefore, the provision of adequate resources meeting the needs of different learning style is important (Musa et al 2004). Habib et al (2006) also reported in their study that students supported problem-based learning (PBL) as an effective method of learning and were motivated towards self-learning. The students were convinced that PBL helped them in building up communication skills, interpersonal relationship and problem solving capacity. However, from the study conducted by Tsouab KI et al (2009), they reported that PBL students perceive deficiencies in their knowledge of basic sciences. Their study also showed that the PBL curriculum resulted in no differences or better performance in the acquisition or retention of knowledge as compared
with the traditional teaching curriculum. Students also experienced gaps in the diseases they had learned in the preclinical years. They however concluded that a near full PBL curriculum can improve students' self-directed learning ability and prepare them for self directed learning in the clinical years. They also emphasize the need of better preparation for integrated learning of basic medical and clinical sciences and facilitator training to improve the effectiveness of discussions.

Work is needed to determine the most appropriate outcome measures to capture and quantify the effects of PBL. The critical appraisal of previous studies, conducted as part of the review has provided direction for future research in this area. Despite conflicting evidence, there is a continued movement to integrate problem-based learning into undergraduate medical education.
CHAPTER 3
Methodology

This cross sectional descriptive survey was carried out by distribution of questionnaires to random students of Year 1 and Year 2 medical students (Cohort 2009 and 2010) of the medical programme in the faculty of Medicine and Health sciences, UNIMAS.

Questionnaires included age, sex, race, and year of study. Opinion about different aspects of PBL, like students’ participation, interest, cooperative learning, availability of learning resources and perception on the role of facilitators were included. The students recorded their responses on a 5 point Likert scale; which are strongly agree, agree, neutral, disagree and strongly disagree. Some open-ended questions were also included. Questionnaires were prepared by adaptation from Barman et al (2006), Alper, A. (2008), Maudsley, G et al (2008) and Lam, D (2009).

SPSS version 14 was used to analyse the data. For discussion analysis the statements were grouped into three, strongly agree and agree, neutral, and strongly disagree and disagree.
CHAPTER 4

Results

4.1 Demographic Profile

A total of 165 year 1 and year 2 medical students in FMHS Unimas participated in the study. Among them, 98 students (59.4%) are from Year 1 and 67 (40.6%) from Year 2. The range of age is 19-22. The mean age is 19.73 with standard deviation 0.708. Female made up 66.7% of the respondents and male 33.3%. 46.1% of the respondents are Malays, 44.8% are Chinese, and 3.6% Indians and 5.5% are other races. Refer to Table 1.

<table>
<thead>
<tr>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of Study</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Race</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Table 1: Demographic profile of the respondents
4.2 Attitude scale on various aspects of PBL

Responses on perceptions on the following aspects are rated by 5 point Likert’s scale:

a) Problem solving and self directed learning (SDL)

b) Cooperative Learning

c) Learning Resources

d) Role of Facilitator

4.2.1 Problem solving and self directed learning

Table 2 shows the distribution of respondents’ perception for each statement regarding to problem solving and SDL. The statement that students most strongly agreed (20.6%) is time allotted for each PBL session is enough. Students agreed the most (59.4%) on the statement that they are motivated when they study the problem getting from real life. Students most disagreed on the statement that PBL sessions are more effective in achieving learning objectives (5.5%). The statements that students rated as most strongly disagreed (1.2%) are they can integrate different subjects to solve the problem, they tried to evaluate the relevancy of different books to be studied while searching the resources and they are able to understand in-depth about the topics of PBL.
<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBL sessions more effective in achieving learning objectives</td>
<td>19</td>
<td>11.5</td>
<td>86</td>
<td>52.1</td>
<td>9 5.5</td>
</tr>
<tr>
<td>PBL allows in depth understanding of the topics</td>
<td>30</td>
<td>18.2</td>
<td>85</td>
<td>51.5</td>
<td>3 1.8 2 1.2</td>
</tr>
<tr>
<td>Time allotted for each PBL session is enough</td>
<td>34</td>
<td>20.6</td>
<td>85</td>
<td>51.5</td>
<td>5 3.0 1 0.6</td>
</tr>
<tr>
<td>I can integrate my prior knowledge to solve the problem</td>
<td>20</td>
<td>12.1</td>
<td>96</td>
<td>58.2</td>
<td>5 3.0 1 0.6</td>
</tr>
<tr>
<td>I am motivated when I study the problem getting from real life</td>
<td>23</td>
<td>13.9</td>
<td>98</td>
<td>59.4</td>
<td>4 2.4 1 0.6</td>
</tr>
<tr>
<td>When searching the resources, I try to evaluate the relevancy of different books with the subjects to be studied</td>
<td>24</td>
<td>14.5</td>
<td>80</td>
<td>48.5</td>
<td>6 3.6 2 1.2</td>
</tr>
<tr>
<td>I can integrate the different subjects to solve the problem</td>
<td>10</td>
<td>6.1</td>
<td>83</td>
<td>50.3</td>
<td>5 3.0 2 1.2</td>
</tr>
</tbody>
</table>

Table 2: Perceptions of students on problem solving and self directed learning
4.2.2 Cooperative Learning

Table 3 shows the distribution of respondents’ perception for each statement regarding cooperative learning. Respondents most strongly agreed that some students work harder to prepare them for PBL discussions (27.9%). Students most agreed on the statement that PBL allows opportunity for hearing different perspectives and learning from one another (60.6%). Students most disagreed that they usually participate actively during PBL session (6.1%) and that they like to compete with their group members to solve the problem (6.1%). The students most strongly disagreed (1.8%) that PBL promotes better student participation in the learning process.

4.2.3 Learning Resources

Table 4 shows the distribution of respondents’ perception for each statement regarding learning resources. The statement that students most strongly agreed (10.3%) and agreed (52.7%) is that the resources provided by the library/internet allowed them to satisfy the course requirements. Students most strongly disagreed (13.9%) and most disagreed (33.3%) on the statement that their resources are mainly from the senior students’ work.

4.2.4 Role of Facilitator

Table 5 shows the distribution of respondents’ perception for each statement regarding the role of the facilitator. Students most strongly agreed (14.5%) that facilitator effectively facilitated PBL sessions and provide them with positive learning environment. Students also rated that facilitator provided them with a positive learning environment as most agreed statement (60.0%). Respondents most strongly disagreed with the statement that it is the facilitator’s job to select the chairperson, not the group members (37.6%).
<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>All members in my PBL group participate in discussion</td>
<td>45 27.3</td>
<td>80 48.5</td>
<td>30 18.2</td>
<td>9 5.5</td>
<td>1 0.6</td>
</tr>
<tr>
<td>Some students work harder to prepare them than others to participate in PBL discussion</td>
<td>46 27.9</td>
<td>72 43.6</td>
<td>40 24.2</td>
<td>6 3.6</td>
<td>1 0.6</td>
</tr>
<tr>
<td>PBL promotes better student participation in the learning process</td>
<td>35 21.2</td>
<td>87 52.7</td>
<td>36 21.8</td>
<td>4 2.4</td>
<td>3 1.8</td>
</tr>
<tr>
<td>Being able to collaborate in my group in PBL sessions is very helpful</td>
<td>38 23.0</td>
<td>92 55.8</td>
<td>33 20.0</td>
<td>1 0.6</td>
<td>1 0.6</td>
</tr>
<tr>
<td>PBL provided opportunities for me to contribute ideas</td>
<td>36 21.8</td>
<td>99 60.0</td>
<td>27 16.4</td>
<td>3 1.8</td>
<td>-</td>
</tr>
<tr>
<td>I usually participate actively during PBL session</td>
<td>15 9.1</td>
<td>66 40.0</td>
<td>74 44.8</td>
<td>10 6.1</td>
<td>-</td>
</tr>
<tr>
<td>The learning needs are discussed in depth</td>
<td>15 9.1</td>
<td>77 46.7</td>
<td>64 38.8</td>
<td>9 5.5</td>
<td>-</td>
</tr>
<tr>
<td>I like to compete with my group mates to solve the problems</td>
<td>9 5.5</td>
<td>77 46.7</td>
<td>68 41.2</td>
<td>10 6.1</td>
<td>1 0.6</td>
</tr>
<tr>
<td>PBL promotes students team work and interpersonal skills</td>
<td>36 21.8</td>
<td>98 59.4</td>
<td>27 16.4</td>
<td>3 1.8</td>
<td>1 0.6</td>
</tr>
<tr>
<td>PBL allows opportunity for hearing different perspectives and learning from one another</td>
<td>45 27.3</td>
<td>100 60.6</td>
<td>20 12.1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Table 3:** Perceptions of students on cooperative learning in PBL.
<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Enough learning resources are available in FMHS UNIMAS for PBL sessions</td>
<td>9</td>
<td>5.5</td>
<td>75</td>
<td>45.5</td>
<td>56</td>
</tr>
<tr>
<td>The resources provided by the library /internet allowed me to satisfy the course requirements</td>
<td>17</td>
<td>10.3</td>
<td>87</td>
<td>52.7</td>
<td>47</td>
</tr>
<tr>
<td>My learning resources are mainly from my lecture notes and text books</td>
<td>16</td>
<td>9.7</td>
<td>75</td>
<td>45.5</td>
<td>48</td>
</tr>
<tr>
<td>My resources are mainly from the senior students’ work</td>
<td>4</td>
<td>2.4</td>
<td>26</td>
<td>15.8</td>
<td>57</td>
</tr>
</tbody>
</table>

**Table 4:** Perception of students on learning resources for PBL