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Original Article/นิพนธ์ต้นฉบับ

Challenges in Problem-Based Learning and Suggested Solutions at the School of Medicine, Walailak University: A Mixed-Methods Study

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Abstract

Background: Problem-based learning (PBL) was used in basic and clinical sciences learning in an integrated approach. Despite its implementation into medical curricula around the world over four decades ago, group dynamic issues in PBL are still abundant. To date, there is no publication addressing the difficulties in PBL for Thai medical students.

Objective: To explore difficulties in PBL and suggest solutions at the School of Medicine, Walailak University.

Methods: A sequential explanatory mixed method was employed using the triangulation method to get the information from students, facilitators, and a medical curriculum expert. Anonymous online survey data from students emphasised barriers to PBL and respondents' suggestions. Content analysis was performed on written feedback from facilitators. Finally, a researcher performed a semi-structured interview with a medical curriculum expert. Data were collected throughout the academic year 2016.

Results: A total of 83 (86.5%) medical students responded to the survey, 58 students (69.9%) reported no difficulties in their learning process; 25 students (30.1%) disclosed challenges in learning. Facilitators' feedback was collected from a total of 23 PBL sessions. Factors affecting the PBL process included facilitators' characteristics, course organisation, and learning environment. Favourable characteristics for facilitators included thinking process support (28.7%), appropriate and constructive feedback (27.9%), listening skills (24.3%), safe environment (14.0%), and being concise (5.1%).

Conclusions: Three major factors contributing to PBL difficulties among Thai medical students were facilitator's quality, course organisation, and learning environment. Hence these factors should be optimized to allow students to achieve the best learning process and outcome.

Keywords: Medical education, Pre-clinic, Medical students, Facilitators, Problem-based learning

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Introduction

Problem-based learning (PBL) is an instructional method to provide students with knowledge suitable for problem solving.¹ Small-group discussions of clinical cases as the stimulus for learning, elaboration on prior knowledge, and learning from one another are potential means of facilitation of understanding of problem-relevant information.² This method has been widely used globally and was first introduced into Thailand three decades ago.³ Despite deriving from the Western school of thought, Asian medical schools and students responded positively after adding PBL into their curriculum without cultural incompatibility.⁴ Studies showed that Thai medical students were satisfied with PBL as it provides an opportunity to discuss and solve clinical problems.⁵ However, problems of group dynamics in problem-based learning were still reported.⁶⁻⁸

Our medical school at Walailak University offers a 6-year MD degree program designed for 48 selected high school leavers each academic year. We conduct PBL for basic health science courses, categorized by organ systems, and provided it for the second-year and third-year medical students. Each PBL session consists of into 2 meetings using a paper case to drive learning. The initial five steps are covered in the first meeting including clarifying vocabularies, identifying the problem, exploring pre-existing knowledge, generating hypotheses, and identifying learning objectives. After doing independent study, students come together in the second meeting to discuss the results as a group. And assessment and reflection on learning take place at the end of the second meeting. A total of 13 PBL sessions (ie, 26 meetings) are provided for students divided into six groups for PBL sessions with 2 - 3 facilitators in each group.

In our context, we noticed students who struggled during the PBL group discussion process needed stimulation from facilitators to run the process efficiently. A previous study has found that dysfunctional groups can severely hamper students' self-efficacy, and create anxieties that hinder the learning process.⁹ After reviewing the literature

focusing on the challenges in problem-based learning of Thai medical students, very few publications addressed this issue. We aimed to identify the obstacles from both the students' and facilitators' perspectives as well as possible solutions so that further strategies to improve the learning process could be elaborated.

Methods

A sequential explanatory mixed method study design was used. We used a data triangulation method to get information from three sources; students, facilitators, and a medical education expert in our school. Data were collected throughout the academic year 2016. We invited all third-year and fourth-year medical students to participate in the study and take a survey. And those who gave their informed consent and completed surveys were included. Anonymous responses from the third-year and fourth-year medical students (96 of them) were collected using Google Survey (July - August, 2017). The open-ended survey included barriers to the PBL process and respondents' suggested solutions, negative facilitator influences and ideal facilitator characteristics, faults in the learning materials or learning environments and how to solve the problems. We also collected all written feedback forms from a total of 25 facilitators that were immediately filled out after the second PBL meeting ended, focusing on the problems in the PBL process and suggested solutions, as well as, faults in the learning materials or learning environments and how to solve the problems. These facilitators' feedback forms were collected routinely in order to improve the curriculum. Finally, a researcher (T.P.) performed an interview with a medical curriculum focusing on her experiences in the challenges of using PBL in a pre-clinical medical curriculum and her suggested solutions.

The quantitative data were collected and analysed using Excel 2011 (Microsoft Corp). We coded the qualitative results. And thirty-six codes were selected for categorising



the data with frequency and percentage.

This study was approved by Walailak University Ethics Committee, No. WUEC-16-106-01 on July 25, 2017. Consent was obtained from every student before participation in the survey.

Results

A total of 83 (86.5%) medical students responded to the survey. All participants were younger than 25 years old. The third-year and fourth-year medical students had experienced PBL for one academic year and two academic years, respectively. The majority of the students (58, 69.9%) got through the PBL process without any difficulties. The remaining 25 students (30.1%) replied with several issues. From the written feedback forms, 23 out of 26 PBL sessions were used for the analysis. The other three sessions were lost due to a technical error. Thirty-six codes were created and grouped into three categories that affect the PBL process; facilitator, course organisation, and environment (Table 1).

Factors affecting PBL process were defined as follows:

1) Facilitator

Knowledge:

It was found that ideal facilitators needed to understand the concepts of PBL; emphasize the learning

process, not the knowledge itself.

“Guide us through the whole process, focusing on the process, not the knowledge.”

Student 6

Feedback:

They also needed to be able to lead the group process with various methods; probing questions, or giving constructive feedback

“They need to ask questions and let us think. Not just giving us the answers upfront but guide us through the whole session.”

Student 2

“If we are clueless, I want facilitators to give a suggestion to let the group process run smoothly.”

Student 35

Behaviours:

Furthermore, facilitator’s behaviours also affected the learning process as well. From the data, it could either promote or hinder the process. Facilitators that demonstrated a safe and friendly atmosphere were found to lead the group better.

“I prefer a kind and calming one [facilitator]. We will feel more relaxed, safe, and able to talk more openly.”

Student 25

Table 1 Categories and Factors Affecting the PBL Process

Category	Subcategory	Explanation
Facilitators	Knowledge	<ul style="list-style-type: none"> • Facilitator’s understanding of the concept of PBL • Focus on the process
	Feedback	<ul style="list-style-type: none"> • Constructive feedback • Probing questions
	Behaviours	<ul style="list-style-type: none"> • Professionalism • Safe environment
Course organisation	Timing	Timing constraint with the examination
	Score	Scoring ratio between didactic lecture and PBL
Environment	Room	Out of order facilities
	Equipment	

On the other hand, facilitators that showed certain habits such as giving destructive feedback or not focusing on the group process will hinder the process.

“Some facilitators judged us from the very first session. They want us to know everything from the beginning and not anything less.”

Student 52

“Some [facilitators] made me feel like I was being killed slowly. Some pressure is good but not too much like that.”

Student 10

“Few of them shook their heads and rolled their eyes in dismay when we discussed. Some brought their own laptop and did their work, not paying any attention to PBL at all.”

Student 37

In the student survey about ideal facilitator characteristics, 80 medical students filled out this survey section. Their responses were categorised into five groups. The favourable characteristics included thinking process support (28.7%), appropriate feedback (27.9%), listening skills (24.3%), learning environment (14.0%), and being concise (5.1%) (Table 2).

2) Course Organization

Another factor that affected the PBL process was learning course organization. Most of the courses in our medical school would weigh more score on lectures, not from PBL.

“I have to focus more on lecture parts. PBL is good but the scores in lectures are MUCH higher.”

Student 42

A large group size was one of their concerns because it meant less participation or brain-storming.

“Some members were not able to concentrate because a group with 8 members is quite large.”

Student 17

Apart from that the schedule conflicts also affected the learning process as well.

“Most of the time we have PBL close to the exam we did not focus on it but rather on the upcoming test.”

Student 2

3) Learning Environment

The physical condition of the classroom and the facilities were also mentioned.

“The PC in the room frequently shuts down and we could not access the internet most of the time.”

Facilitator 1

Table 2 Ideal Facilitator Characteristics from Students' Perspectives

Characteristic	Description	No. (%)
Thinking process support	<ul style="list-style-type: none"> Facilitators are able to provide students with thought-provoking questions. Crucial basic science contents are picked up in order to focus attention on clinical correlations. Probing questions are used to encourage students to respond in more depth about the topic being discussed or when groups are struggling in the learning process. Facilitation should be given only when necessary. Minimal group process interruption. 	39 (28.7)
Appropriate feedback	<ul style="list-style-type: none"> Students need feedback from facilitators for accelerating improvement after every PBL session. Facilitators offer students corrective and constructive feedback in a gentle manner. 	38 (27.9)
Listening skills	Facilitators listen carefully without disrupting the group process or rushing things.	33 (24.3)
Learning environment	<ul style="list-style-type: none"> A healthy student-facilitator relationship. A safe environment for the students to talk about their ideas. 	39 (28.7)
Being concise	Facilitators should focus on the PBL scenario without being off-track.	7 (5.1)



Discussion

PBL is a student-centered strategy in which students learn in small groups to discuss a problem collaboratively. This widely used method is one of the active-learning methods for adults helping them achieve lifelong skills compatible with the 21st century framework.¹⁰ The goal is not to solve the problem but rather help students identify their learning needs as they attempt to understand the problem.¹¹ Although PBL has been implemented in the medical curriculum for a long time, problematic issues are still reported.^{7, 8}

Recently, one study conducted in Pakistan described problems of group dynamics in PBL. Students ranked “dominant students” as the most important factor that hindered the learning process while facilitators ranked “quiet students” and “lack of commitment” as the most important factor.⁶ However, facilitators’ characteristics and the learning environment were not mentioned.

We aimed to identify the obstacles from both the students’ and facilitator’ perspectives as well as plausible solutions. To date, research addressing these issues in Thailand is scarce. We intended to collect the data with open-ended questions from anonymous responses. Surprisingly, we achieved a very high response rate (86.5%) with this method. This may be due to the fact that the survey was anonymous so that students felt more comfortable expressing their opinions. We also used a data triangulation method to increase the rigour of our work.

We found that approximately one-third of medical students struggled to learn with the PBL method. Their common difficulties were attributed to facilitator characteristics, course organization, and learning environment. Interestingly, the facilitator’s characteristics seemed to play a crucial role and affected the group learning process. The most favourable characteristics as proposed by a majority of the medical students included facilitator’s performance on facilitation and feedback, and a safe environment. This is consistent with one previous study, where the characteristics of a good PBL facilitator from the students’ perceptions included having an

enquiring mind, finishing the PBL session on time, keep the discussion going, allowing students to explore different aspects of the case and so forth.¹² These support the finding that facilitators are a key factor in PBL. Thus, validating facilitators should be mandatory in order to foster suitable facilitation skills.¹³⁻¹⁵ In addition, feedback is also a crucial activity for facilitators to enhance students’ learning. We found that students preferred feedback from facilitators in a corrective and constructive way. One previous study found that both feedback on knowledge and feedback on generic skills were valuable. These skills consisted of participation in discussion, communication and interpersonal skills, collaborative learning, time management, leadership skills, and reflective ability.¹⁶

Regarding the PBL group size, the proposed size of the group varied somewhat among medical schools. In the UK, a group is comprised of 6 - 8 students.¹⁷ Meanwhile, Southern Illinois recommends a group of 5 - 6 students.¹⁸ Studies suggest that smaller groups are superior to other forms in terms of developing critical thinking and decision making.^{19, 20} Further study should be performed in order to examine whether critical thinking develops more efficiently in smaller group size in Thailand.

We are aware that our study is not without limitations. The first limitation is the missing data. There were 13 students (13.5%) who did not reply. We also could not track three PBL sessions facilitators’ feedback forms due to a technical error. Therefore, some potentially useful information may have been lost. Secondly, we collected data from students and facilitators through written forms. Therefore, some issues were left unexplored. Direct interview with participants would fill these gaps in future work.

We hope that our research will be valuable in solving the difficulties Thai medical students face with a PBL process. Strategies for sustaining and certifying facilitators’ quality should be mandatory in medical schools that use PBL as a learning method to achieve the best learning process and outcome for the students. Possible



suggestions are intensive workshops for staff, regulations to ensure their facilitating skills are regularly refreshed, and there should be more research in medical education. Moreover, the modifiable factors identified in this study should be reorganised including adequate self-study time for the students, a higher percentage of PBL scores in each course, and reorganization of the schedule to avoid arranging PBL sessions that are too close to the examination date.

Conclusions

Three major factors contributing to PBL difficulties among Thai medical students include the facilitator's quality, course organisation, and learning environment. Hence these

factors should be optimized to allow students to achieve the best learning process and outcome. Strategies for sustaining quality in PBL facilitation should be established.

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Original Article/นิพนธ์ต้นฉบับ

ปัญหาที่พบบ่อยในกระบวนการเรียนรู้ โดยใช้ปัญหาเป็นฐานและแนวทางการแก้ไขปัญหา สำนักวิชาแพทยศาสตร์ มหาวิทยาลัยวลัยลักษณ์: การวิจัยแบบผสม

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บทคัดย่อ

บทนำ: การเรียนรู้โดยใช้ปัญหาเป็นฐาน (Problem-based learning, PBL) ได้รับความนิยมผนวกเข้ากับการจัดการเรียนการสอน เพื่อบริหารจัดการความรู้วิทยาศาสตร์พื้นฐานและวิทยาศาสตร์ทางคลินิก แม้ว่าโรงเรียนแพทย์หลายแห่งบรรจุการเรียนรู้โดยใช้ปัญหาเป็นฐานในหลักสูตรแล้ว แต่ยังไม่เห็นผลการศึกษาวิจัยที่กล่าวถึงปัญหาการเรียนในมุมมองของนักศึกษาแพทย์ไทย

วัตถุประสงค์: เพื่อระบุปัญหาการจัดการเรียนการสอนแบบการเรียนรู้โดยใช้ปัญหาเป็นฐาน พร้อมแนวทางการแก้ไข ณ สำนักวิชาแพทยศาสตร์ มหาวิทยาลัยวลัยลักษณ์

วิธีการศึกษา: การวิจัยแบบผสมประเภทการออกแบบต่อเนื่องเชิงอธิบาย (Sequential explanatory mixed-method) ตรวจสอบสามเส้าด้านข้อมูล (Data triangulation) โดยรวบรวมข้อมูลจากแบบสอบถามออนไลน์แบบไม่ระบุตัวตนจากนักศึกษาแพทย์ ชั้นปีที่ 3 และปีที่ 4 ข้อมูลป้อนกลับจากวิทยากรกระบวนการ และสัมภาษณ์ผู้เชี่ยวชาญด้านหลักสูตร โดยเก็บข้อมูลตลอดปีการศึกษา 2559 ณ มหาวิทยาลัยวลัยลักษณ์

ผลการศึกษา: นักศึกษาแพทย์ที่ตอบแบบสอบถาม จำนวน 83 คน คิดเป็นร้อยละ 86.5 พบว่า ร้อยละ 69.9 ไม่มีปัญหาการเรียนรู้โดยใช้ปัญหาเป็นฐาน และมีเพียงร้อยละ 30.1 ระบุปัญหาการเรียนรู้โดยใช้ปัญหาเป็นฐาน จากการรวบรวมข้อมูลป้อนกลับของวิทยากรกระบวนการจำนวน 23 ครั้ง พบปัจจัยที่มีผลต่อการเรียนรู้โดยใช้ปัญหาเป็นฐาน ได้แก่ ลักษณะของวิทยากรกระบวนการ การจัดการเรียนการสอน และสิ่งแวดล้อมการเรียนรู้ โดยลักษณะของวิทยากรกระบวนการ ฟังประสงค์ ได้แก่ สนับสนุนกระบวนการคิด ให้ข้อมูลป้อนกลับที่เหมาะสม มีทักษะการฟังที่ดี สร้างสิ่งแวดล้อมปลอดภัย และกระชับเนื้อหา

สรุป: ปัจจัย 3 ประการสำคัญที่ส่งผลกระทบต่อการเรียนรู้โดยใช้ปัญหาเป็นฐาน ได้แก่ คุณภาพของวิทยากรกระบวนการ การจัดการเรียนการสอน และสิ่งแวดล้อมการเรียนรู้ ดังนั้น การปรับปรุงปัจจัยดังกล่าวอาจทำให้การเรียนรู้โดยใช้ปัญหาเป็นฐานช่วยส่งเสริมผลการเรียนรู้ได้ดียิ่งขึ้น

คำสำคัญ: แพทยศาสตรศึกษา ปรีคลินิก นักศึกษาแพทย์ วิทยากรกระบวนการ การเรียนรู้โดยใช้ปัญหาเป็นฐาน

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