

# Comparing the Views on Problem-Based Learning from Medical Education Students in Zhengzhou University in China and the University of Bristol in the UK

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## Abstract

Problem-based learning (PBL), as a student-centred learning method, refers to students actively participating in a group scenario to solve open-end problems. This study aims to compare the students' attitudes on PBL in Zhengzhou University and the University of Bristol. This study adopts qualitative methods. By conducting semi-structured interviews with eight participants, four from Zhengzhou University and the others from the University of Bristol. Overall, the results of the study indicated that students from both two universities are overall satisfied with PBL because of its contribution to deeper understanding of medical knowledge and skill development and they all think that the quality of group discussion and the efficiency of PBL classes need to be improved. In terms of the different views from two universities, when it comes to the biggest benefit of PBL, students from Zhengzhou University are more likely to choose clinical thinking, while students from the University of Bristol are more satisfied with the deep understanding on medical knowledge. Unexpectedly, although Zhengzhou University has implemented PBL for fewer years than the University of Bristol, students are more satisfied with and motivated in PBL classes than those of the University of Bristol.

**Keywords:** problem-based learning, students' attitudes, curriculum efficiency

## 1. Introduction

Student-centred learning means that learners actively and autonomously participate in learning (O'Neill & McMahon, 2005), which is opposed to traditional teacher-centred learning. Problem-based learning (PBL) as one of the student-centred learning methods refers to encouraging students to solve open-end problems in a group scenario (Hmelo-Silver, 2004).

Previous literature shows that PBL assessment is usually done on the basis of students' academic performance or views from teachers or institutions rather than on the opinions of students. It is crucial to explore the students' perspectives on PBL classes because students are the direct audience of experiential in the process of teaching. The purpose of this study is to compare students' views of PBL in Zhengzhou University and the University of Bristol, which are the leading universities in China and the UK respectively. The research question is what are the similarities and differences of students' perspectives on PBL at Zhengzhou University and the University of Bristol?

### 1.1 Rationale of the Research Topic

In China, teacher-centred approaches and high-stake and frequent examinations dominate the whole education system from primary schools to higher education institutes. Such a model makes students passive information receivers who learn by rote memorisation rather than with analytical and critical thinking. Even worse, it could baffle students' willingness to communicate and innovate, producing students with high scores but poor competence. As a student educator eager to make a difference to China's future generations, the researcher worries about the current situation and seeks change. Accidentally, the researcher researched a primary school which was conducting PBL method, and found that PBL helped boost students' motivation and academic performance. Studying in the University of Bristol deepened the researcher's understanding of student-centred learning and culminated in the idea that PBL could be a potential solution to China's education problem, hence this study explores the comparison of medical students' views on PBL in China and the UK.

### *1.2 Significance of the Study*

The importance of comparing the students' attitudes on PBL is to address the research gap in previous literature. Recent literature mostly focuses on comparing PBL with traditional learning (Savery, 2006), with few articles giving thought to the effects of institutional culture on PBL operation. This research, however, considering different learning contexts, explores the views of students from China and the UK on PBL, which to some extent fills the void of geographical concern in PBL research. According to Levitt, McKeage, and Rangachari (2013) and Savin-Baden and Major (2004), it is important to evaluate students' voices in the process of learning and courses. However, in general, it is common to assess the results of PBL based on teachers' experience and students' academic performance rather than on students' views in the learning process which is missed a significant element on the courses evaluation. Overall, the significance of the study lies in its helpful and positive information to academic staff and universities that can be used to improve the implementation of PBL in the future curriculum.

### *1.3 Literature Review*

Traditional teacher-centred education has grown to be unsatisfied in motivating and developing students' knowledge and competences (Barrows, 1996; Silva, 2018). As a student-centred learning method, the first model of PBL was adopted by the McMaster University in Canada in medical education in the 1960s before spreading to the USA. In the late 1980s, this innovative method was noticed by British educators and gradually permeated other professional education programmes. Now it has become popular among educators and scholars from all over the world (Savin-Baden & Major, 2004; Prihatiningsih & Qomariyah, 2016). It is advocated that PBL is a learning method with which learners explore the answers of authentic problems and gain the upper-level knowledge and skills such as problem-solving and critical thinking (Colliver, 2000; Henk, Jerom, & Elaine, 2011; Ceker & Ozdamli, 2016). Barrows and Tamblyn (1980) hold that PBL encourages students to participate in problem scenarios actively. Those PBL pioneers, aiming at modifying and enhancing conventional curricula, emphasise on students' self-directed and collaborative learning to develop problem-solving and teamwork skills (Hernández et al., 2018; Chang, 2016).

According to relevant literature, PBL features open-end problems in real life, encourages collaborative work and self-directed learning (Savin-Baden & Major, 2004; Song et al., 2005; De Boer & Otting, 2011). White (2001) notes that problems as a crucial element need to be not only open-end, which means having multiple solutions, but also linked with the real scenario. Open-end questions in real-life not only stimulate creativity and flexible thinking (Savery, 2006; Levitt, McKeage, & Rangachari, 2013; De Boer & Otting, 2011), but also facilitate future knowledge retrieval as the knowledge can recall when the situation resembles the context in the class (De Boer & Otting, 2011; Bestetti et al., 2014). Although Bate et al. (2014) find that students feel their time is 'wasted' on unnecessary debates or on guessing answers with members who have similar level of prior knowledge, majority literature supports and encourages the collaboration on a team because it provides opportunities on students' in-deep understanding (Savin-Baden & Major, 2004; Tang et al., 2008). In specific, students who want to engage in the group discussion need to manage the answers of problems and evaluate members' response during the process of debate which leads to the deep understanding of professional knowledge (De Boer & Otting, 2011; Vernon & Blake, 1993). As an instructional student-centred learning method, self-directed learning has a significant characteristic which allows students to be active participants and to take responsibility for their learning (Bate et al., 2014; Hernández et al., 2018). While some students feel stressful about self-regulation (Pekrun et al., 2002), Bate et al. (2014) suggest that self-directed learning allows learners to identify their own learning needs, seek relevant information and determine the learning process to provide viable solutions in a team (Savery, 2006; Shin & Kim, 2013; Hartling et al., 2010).

By searching keywords such as 'PBL' and 'medical education' on academic websites and databases, 24 articles of authority and relevance are selected for analysis. In most articles, PBL is evaluated from two perspectives: academic performance and skills. Specifically, 18 articles focus on educational outcomes and 12 of them (66.7%) show that PBL is superior to traditional learning in academic performance and future career, while the rest (33.3%) show that there is no difference or even negative consequences on PBL compared with traditional learning (Savin-Baden & Major, 2004; Hande, Mohammed, & Komatil, 2015). In terms of skills evaluation, 18 articles all state that PBL is successful in enhancing students' capacity such as problem-solving skills, independent learning and interpersonal skills (Collard, Brédart, & Bourguignon, 2016; Ding et al., 2014). In conclusion, most literature holds that PBL is an innovative and positive teaching method to improve students' academic performance and skills.

## 2. Methodology

### 2.1 Participants

This study uses a qualitative method to meet the need for an in-depth comparison of the medical students' perspectives in PBL class (Hammarberg, Kirkman, & De Lacey, 2016). The sample of this research consisted of eight students, with four from Zhengzhou University and four from the University of Bristol. The small sample of participants ensures that the researcher has enough time and experience to explore and interpret their perspectives in-depth (Matthews & Ross, 2010). Participants from Zhengzhou University are all-male postgraduates majoring in clinical medicine, with PBL experiences in their undergraduate years; while those from Bristol University are all-female medical undergraduates who had PBL classes very recently. As such, this program could potentially manifest both long-term and short-term influences of PBL. The necessary information of participants is displayed in Table 1.

Table 1. Basic information of participants

University	Participants	Gender	Major	Grade
Zhengzhou University	Participant 1	Male	Clinical Medicine	Second-year postgraduate
	Participant 2	Male	Clinical Medicine	First-year postgraduate
	Participant 3	Male	Clinical Medicine	First-year postgraduate
	Participant 4	Male	Clinical Medicine	First-year postgraduate
University of Bristol	Participant A	Female	Pharmacology	Third-year undergraduate
	Participant B	Female	Pharmacology	Second-year undergraduate
	Participant C	Female	Pharmacology	Second-year undergraduate
	Participant D	Female	Neuroscience	First-year undergraduate

### 2.2 Data Collection

Data collection was conducted through semi-structured interviews. In this regard, the choice of the semi-structured interview is in line with the purpose of the research, as it provides participants with the opportunity to share whatever they may think about PBL classes. Besides, the researcher could be inspired by participants' answers and put forward more relevant questions, thus acquiring an in-depth understanding of the student-centred approach.

Based on the research questions, interview questions were designed to investigate participants' attitudes towards PBL, such as the advantages or disadvantages of the PBL and challenges they faced in PBL classes. To maintain an objective assessment, Likert Scale was adopted in this part, where the intensity of participants' feelings for their PBL experiences was captured by a typical Likert scale, which in this case was formatted as very unsatisfied, unsatisfied, neutral, satisfied and very satisfied (Jamieson, 2004).

Participants from the University of Bristol were interviewed face to face. It is believed that face-to-face interviews could contribute to data of higher quality, as they enable intuitive communication between the interviewers and interviewees and mobilise their activeness (Holbrook, Green, & Krosnick, 2003). For students from Zhengzhou University, voice chat via WeChat was adopted due to the geographical distance in between. However, the remote interview can be tricky to handle without incentivisation.

### 2.3 Data Analysis

Data from both face-to-face interviews and WeChat interviews were analysed using thematic analysis methods, which is 'a method for identifying, analysing and reporting patterns within data' and is widely used in qualitative research analyses (Braun & Clarke, 2006).

After transcribing the recordings of the interviews, NVivo was used to generate codes out of all the transcriptions

from the semi-structured interviews. Codes are the key or central ideas related to research questions (Braun & Clarke, 2006; Nowell et al., 2017). The researcher evaluated the codes and systematically divided them up into sub-themes via NVivo. Related the research question and literature, the researcher decided the final themes and selected some vivid and compelling examples of data for each theme. The final thematic maps and findings are presented in Finding.

### 3. Results

To answer the research questions: What are the similarities and differences of students' perspectives on PBL at Zhengzhou University and the University of Bristol? students' perspectives are divided into three categories, including the positive perspectives of PBL, the negative attitudes of PBL and the overall scores on PBL evaluation.

#### 3.1 Students' Perspectives on PBL in Zhengzhou University

Students from Zhengzhou University gave both positive and negative perspectives on PBL. In terms of positive views, they mentioned that PBL gave them learning motivation, helped them in acquiring medical knowledge and skills and got them closer to tutors. However, they also pointed out that preparation for PBL classes took them too much time, and that the management of tutors need to be improved. The specific themes are summarised in Table 2, and accurate information will be explained later.

Table 2. Students' views of PBL at Zhengzhou University

Themes	Sub-themes	Codes
Positive views	Motivation of learning	Prefer to study on PBL classes
		Interesting class atmosphere
		Improve the participation
		Mobilize enthusiasm of learning
	Clinical knowledge	Deep understanding on clinical knowledge
		Clinical thinking to real-life practice
		Remember knowledge last longer
	Skills	Communication skills
		Problem-solving skills
		Self-learning skills
Relationship with tutors	Get familiar with tutors	
	Learn current clinical knowledge	
	Guide the personal future directions	
Negative views	Disadvantages	Less effective than lectures
		Increase pressure and workload
		Insufficient tutors
		Less responsibility on some tutors

#### 3.1.1 Positive Views on PBL

Firstly, all participants from Zhengzhou University said that they preferred to study in PBL classes compared with traditional teaching classes as PBL provided with them an innovative learning experience and motivated them to learn more. Specifically, group discussions which were refreshing to them aroused their interests for classes, and patients' cases and problems related to reality boosted their enthusiasm for clinical practices. In contrast, in traditional education, teachers instilled a lot of knowledge that they were more likely to get bored with so as to resist in practices. Participant 1 supported the PBL:

*'PBL was a vivid and interesting way of learning, especially in the process of group discussion. The debate was very fierce, including many brilliant ideas, which motivate us to actively share our opinions and allow me to find the shining points of other students.'*

Similarly, participants 4 said their attitude changed after PBL:

*'In the surgery course of PBL, the teacher took us to the actual bedside to solve problems. During this process, I felt my identity change from student to doctor, which made me feel proud and responsible. After that, I became more active and motivated in my study.'*

Participants 3 even said the atmosphere of PBL encouraged everyone to participate:

*'In a PBL class where everyone was actively involved in the discussion, I would feel a sense of shame if I didn't contribute my ideas to the group.'*

Secondly, participants from Zhengzhou University mentioned that PBL helped them in memorising and applying theoretical medical knowledge. Participant 1 stated that PBL cultivated long-term memory of medical knowledge:

*'It was a completely different experience to study a particular case in PBL and then go back to textbooks, as opposed to just studying the textbook in a traditional class. The memory of medical knowledge on PBL was so strong that I still had not forgotten the case that I studied in PBL.'*

Furthermore, participant 2 indicated that PBL allowed studying in a real-life scenario:

*'Before PBL, I was confused about how to properly treat a patient because I only learned from textbooks about the idealistic attitudes towards fictional patients. However, after PBL classes, I gradually understood and changed my attitudes on how to solve cases and treat patients.'*

Similarly, participant 4 highlighted the clinical thinking that was learnt from PBL:

*'The greatest reward from PBL was clinical thinking, which is also a thinking process of diseases often mentioned by our tutor in class. In traditional learning, we would first know the name of the disease and then analysed the symptoms and treatment of the disease. However, clinical practices in real life were often conducted in a reverse order. In clinical practice, doctors would first understand some pathogenesis and symptoms of patients, and then made a preliminary diagnosis, which was similar to the whole discussion process of PBL. I think that PBL lays a foundation for my clinical practice which is especially useful after I have been exposed to the hospital.'*

Besides learning motivation and medical knowledge, all participants mentioned that PBL helped them develop transferrable skills, including communication skills, problem-solving ability and self-learning. Participants 1 and 3 both mentioned that PBL developed their ability to find and solve problems. Participant 2 said that PBL strengthened the sense of teamwork:

*'I learned how to organise group work from PBL because I was the team leader, which means I need to participate in the discussion and take responsibility of the whole group. So, at the end of this session, I found that I could communicate with others more confidently, and I have since developed a strong sense of responsibility.'*

When it comes to self-learning, participant 1 said:

*'The best benefit of PBL was that it helped cultivate self-learning and self-thinking ability. During PBL classes, I would actively use textbooks, literature and medical guides to prepare the answers to problems independently. Although there was no connection between the discipline I chose as a master student and the case of PBL, it is helpful to cultivate the abilities of self-learning.'*

Three participants said that the relationship between tutors and students became closer after PBL classes and that tutors were likely to share their experiences with students. Participant 4 expressed his feeling about his relationship with tutors:

*'Unlike the traditional classroom where teachers taught over 100 students on a podium, tutors in PBL classes stepped down from the platform and interacted with students. For me, tutors are like my friends who could give me many useful suggestions and help me with my study.'*

Participants 3 said:

*'Tutors coming from the hospital were particularly willing to share their clinical experience and help us avoid common mistakes in practice. They would tell us not to apply some outdated medical theories on textbooks that were often slow to update. Still now, when I recalled the PBL classes, the warmest memory was the harmonious relationship between group members and tutors.'*

Participant 2 said that his PBL tutor helped him find his current direction:

*'The reason why I choose to study urology in my postgraduate years was the guidance of my PBL teacher. Originally, I wanted to pursue my postgraduate in internal medicine, but the tutor of PBL suggested that surgery was a better choice for me because I am very outgoing but internal medicine might be a little depressing. After an in-depth discussion with the tutor, I decided to devote myself to urology.'*

### 3.1.2 Negative Views on PBL

First, participant 1 and 4 pointed out that PBL was not as efficient as traditional education due to the less effective discussion. For example, participant 1 commented that group discussion would tend to be endless:

*'Compared with teachers, students had less knowledge reserve, and sometimes discussions came to a dead-end which wasted a lot of time. Although PBL helped me learn a specific disease, it was unpractical to adopt PBL on large-scale learning.'*

Secondly, all the participants mentioned the PBL increases the pressure and workload because they need to undertake a lot of preparation before PBL. Participant 3 said:

*'In traditional classes, I don't need to do any extra work except listening to lecturers. For PBL, however, I would have to spend three to four hours on preparation for the 45-minute class. Besides, I felt very nervous when tutors suddenly asked me to answer a question.'*

Finally, almost all participants mentioned that in PBL, there were insufficient tutors, and some tutors did not take their due responsibility. Participant 2 said:

*'The tutors working in hospital were stressed, and sometimes they would bring their negative emotion in work into the classroom. The classroom atmosphere would become very depressing, which could not stimulate our study very well.'*

### 3.1.3 Overall Scores on Evaluating PBL

In order to assess PBL more objectively, participants were asked to finish a Likert Scale which includes their evaluation on specific characteristics of PBL. The Likert scale ranges from 1 to 5, with higher scores indicating greater satisfaction. The average score of Zhengzhou University participants was 4.1/5. Participant 1 gave 3.5 and stated his reason: "PBL was a good learning style, but considering its low efficiency, I think clinical learning should be dominated by traditional classes with PBL as a supplementary tool". Participants 3 and 4 both gave 4 and said that

*PBL helped with their study but needed improvement. Participant 2 gave a perfect score and explained: "I like interacting with people and can quickly engage myself in a group discussion scenario. That's why I enjoy PBL classes."*

Most participants chose 'satisfied' or 'very satisfied' on the Likert Scale and nobody chose 'unsatisfied' or 'very unsatisfied'. Specifically, all participants felt 'satisfied' or 'very satisfied' with the quality of problems, help from tutors, knowledge and skills learnt from PBL and the motivation of PBL. In contrast, in terms of the quality of teamwork, half of the participants felt 'neutral' about group discussion because there was a lack of cooperation between group members. Some members preferred to find answers from textbooks rather through discussions, and some stayed silent during group discussion. The results of visualisation are shown in Figure 1.

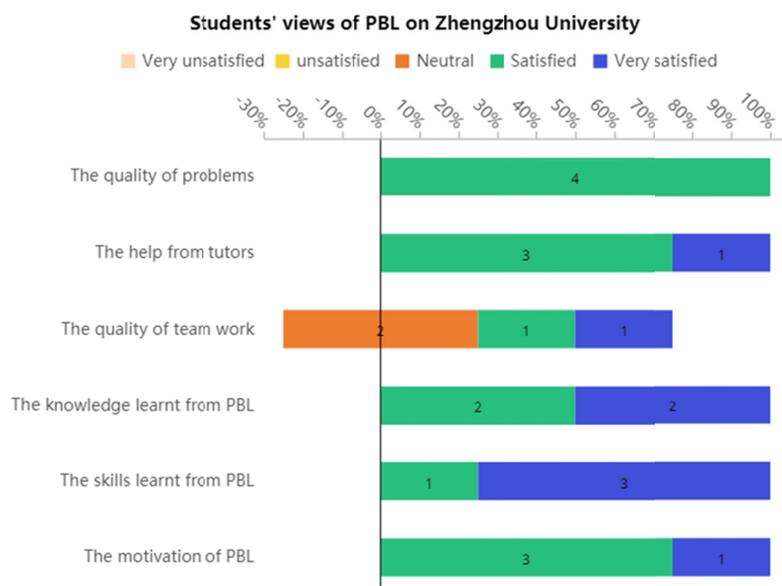


Figure 1. Students' evaluation on the Likert Scale at Zhengzhou University

### 3.2 Students' Perspectives on PBL at the University of Bristol

Students from the University of Bristol demonstrated both positive and negative attitudes towards PBL. In terms of positive perspectives, they mentioned that PBL cultivated their learning skills and increased their medical knowledge as well as motivating their learning. However, they also pointed out the disadvantages and challenges of PBL. The specific themes and codes are shown in Table 3.

Table 3. Students' views of PBL at the University of Bristol

Themes	Sub-themes	Codes
Positive views	Medical knowledge	Measure and refresh previous knowledge
		Deep understanding on professional knowledge
		Transfer the theory to practice
		Learn interdisciplinary knowledge
	Learning skills	Group work skills
		Confident express opinions
		Problem-solving skills
	Motivations	Interesting learning style
		keep being conscious on learning process
		Contribute to classes and group interactions
Negative views	Disadvantages	Problems too difficult
		Tutor fail to mobilize students
	Challenges	Less effective as lectures
		Difficult to express ideas on group
		Hard to control other members

#### 3.2.1 Positive Views on PBL

The benefits of PBL are manifested in three aspects: a general better command of medical knowledge, the improvement of learning skills and higher learning motivations. Firstly, all participants from the University of Bristol highlighted that PBL deepened their understanding of medical theories and clinical practices. By holding discussions of the same themes as lectures, PBL classes tested and developed students' abilities of applying medical theories to practices. Both participant B and C said that PBL was a right way of measuring and summarising how much they have learnt and grasped from lectures. Participant D said that PBL cultivated deep understanding of medical knowledge:

*'In lectures, the only thing I need to do was listen to teachers and memorise what they said. But PBL required a lot more. For example, if I feel that my members are wrong, I need to think about why I believe them to be wrong? How am I going to explain and debate it? That required me to go back over and think what I've learned in lectures and other materials.'*

Moreover, the PBL class taught students how to apply what they learn from theory to practice by simulating real-life scenario in hospital. Similarly, participant B said:

*'PBL classes offered specific disease cases. I remember in one case we were asked to treat a schizophrenia patient, and we needed to discuss and analyse the people according to a personal situation. This situation was relevant for future work, especially for those who want to continue their studies in pharmacy. For me, it was good for the future because I really like my course. So, I'm quite focused on it and used the knowledge to future work.'*

Participant B and C majored in pharmacology mentioned that some PBL classes were held with students in physiology or neuroscience, which helped them to learn interdisciplinary knowledge during the process of discussion.

Secondly, all participants mentioned that PBL helped them to gain some learning skills such as collaboration and problem-solving. Participant B said that PBL improved her confidence in communication:

*'In PBL classes, I learnt how to balance the roles of hearer and speaker in a group. At first, I was more comfortable listening to others and learning from their opinions in a group discussion. But after PBL, I got braver and contribute to discussion compared with the beginning when I don't really talk at all.'*

Furthermore, participant D mentioned that PBL provided the teamwork tips:

*'I learned some group work strategies such as how to communicate with people who have opposite views from yours. Everyone could make mistakes, and it sounded weird to figure out the faith of your team members. PBL definitely helped me with teamwork skills.'*

Moreover, participant A, B and C said that PBL helps them to use various methods in solving one problem. For example, participant A said:

*'I am a self-learner. Through the guidance of PBL, I quickly learnt how to use various materials such as books and the Internet to solve problems and construct my knowledge framework.'*

Participant B mentioned how to solve problems through self-learning and discussion:

*'PBL definitely helped me in problem-solving because it gave me time to sit down and go down some medical roots so that I can use that to solve a problem in the future.'*

Finally, participant C and D said PBL motivated their learning strategies and helped them to focus on the content of learning compared with lectures. Participant B said

*'In a traditional one-hour class, normally I would easily feel tired and could only concentrate for 20 minutes at most. PBL was very interesting, and the group interaction often engaged me along the whole class.'*

Similarly, Participant D said:

*'In big lectures, a lot of people sit there and do not really do anything or contribute. For me, I would easily fall asleep and could not focus on what the lecturers were saying especially when I wore glasses. However, in PBL, I would speak more and keep awake in discussion.'*

### 3.2.2 Negative Views on PBL

Although PBL contributes a lot to medical learning and skill development, there are some disadvantages and challenges according to students from the University of Bristol. Firstly, although most of the problems were related to the content of lectures, participants A and C mentioned that some problems could involve what students had not learned yet, which was difficult for students to solve and discuss. For example, participant A mentioned:

*'One of the main problems for first-year undergraduates was the treatment of depression, which was intended for second-year schedule and thus increased a lot of workload for students.'*

Secondly, participant A and B said that some students felt confused and even resistant to PBL class when teachers failed to give a clear introduction of the purpose of the class.

Thirdly, participant B mentioned that PBL was not as effective as traditional teaching methods as it wasted a lot of time. She said:

*'PBL takes quite a lot of time to prepare, but it only accounts for one per cent or less of our grade. So, it is hard for some students to get motivated to put their effort in especially when you have got a lot of other work.'*

Finally, participant A, B and D said that speaking in front of many people and working in group were big challenges for them. Participant D said the biggest challenge was expressing her opinions:

*'I think the biggest challenge for me is to speak up and express ideas in a group because I am not really confident with my answers. Many thanks that the tutors and members help me to overcome it.'*

In terms of group work, participant A mentioned that it was difficult to motivate all the members to contribute to a task:

*'When our group worked on a presentation together, one of the team members failed to finish his part, which caused insufficient time for us to discuss how to present our work. Therefore, I think it was tough to control the progress of others, and if the cooperation of PBL was unpleasant, the efficiency was not as high as self-study.'*

### 3.2.3 Overall Scores on Evaluating PBL

The average rating from the University of Bristol participants is 4.1/5. Participant A gave 3.5 points and said:

*'Although I enjoyed self-learning in PBL, the group cooperation was not very pleasant in my group'. Participants B and D gave 4 because they think PBL is a good way of learning with its teamwork pattern. Participant C gave a full score and claimed that PBL was very helpful for her study, notably because of the setting of real cases and problems in PBL classes.*

According to the Likert Scale analyse, all participants from the University of Bristol were 'satisfied' or 'very

satisfied' with the quality of problems, the skills learnt from PBL and the motivation of PBL. In contrast, half of the participants gave a neutral comment on teamwork efficiency, and one even gave an 'unsatisfied' answer because it was an unpleasant experience. In terms of help from tutors and the knowledge learnt from PBL, one participant chose 'neutral', others chose 'satisfied' or 'very satisfied'. The summary results of the Likert Scale are displayed in Figure 2.

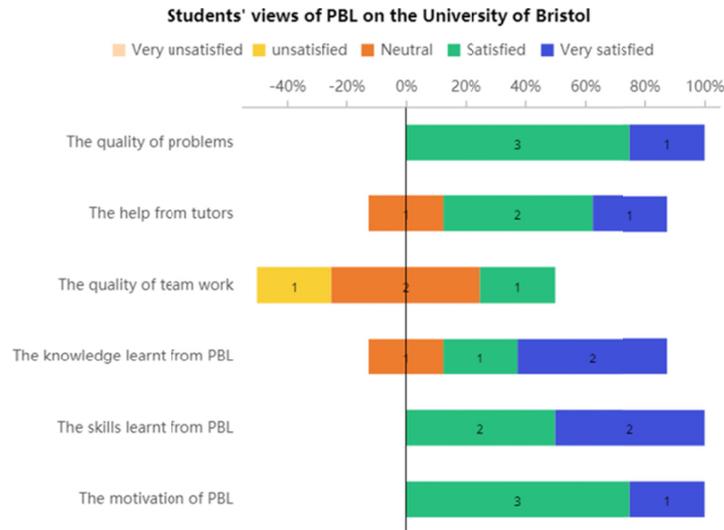


Figure 2. Students' evaluation from the Likert Scale in the University of Bristol

## 4. Discussion

### 4.1 Similar Views on PBL

The findings show that students from both two universities satisfied with PBL classes. With an average score of 4.1 on PBL of both universities, students used some positive words such as 'pretty good', 'enjoyable experiences', 'beneficial' and 'definitely help' to evaluate the PBL during the process of interviews and all participants agreed that PBL improved transferrable skills such as group work skills, problem-solving skills, and self-learning skills. These findings are consistent with the results of literature review, which indicates that PBL improves the academic performance and skills of medical students. Besides, this research investigated students' attitudes towards PBL and concluded general positive evaluation by students from two different universities despite their distinct cultural contexts and learning styles, which provides a new insight into current PBL research.

Although working in groups helps to develop essential skills and generate enthusiasm, students from both universities were unsatisfied with the quality of group work, with half participants in Zhengzhou University choosing 'neutral' on the Likert Scale and the majority from the University of Bristol choosing 'neutral' and even 'unsatisfied'. Most students suggested that it was difficult to motivate all members to contribute to group discussions and even harder to manage group tasks when someone fails to take their due responsibility, which could lead to unpleasant teamwork experience. Too often has previous literature focused only on the outcomes of PBL rather than students' feelings of its implementation pattern. Such findings may provide a new approach to its future improvement.

### 4.2 Different Views on PBL

When it comes to the biggest benefit of PBL, participants from Zhengzhou University focused on clinical thinking related to the future work, while students from the University of Bristol were more concerned about the deep understanding of professional knowledge. This is because all participants from Zhengzhou University have graduated and began to apply medical knowledge to clinical practice in hospitals. Thus, when they reflected on their PBL experience, they agreed that PBL helped them prepare for the role transition from a student to a doctor. In contrast, the University of Bristol students highlighted that they gained a deep understanding of medical knowledge by repeating and discussing the same topics as lectures. As all participants from the University of Bristol are undergraduate students lacking the opportunities to work in a hospital, they are more likely to focus

on the current medical knowledge learning. Therefore, the knowledge learned from PBL not only is beneficial to professional understanding, but also has a long-term influence on future work or study.

In terms of the motivation of PBL, all participants from Zhengzhou University stated that they enjoyed discussing with tutors and students. Some even mentioned that such discussions helped them find their future direction on career development. Compared with participants in Zhengzhou University, most participants from the University of Bristol do not think that the motivation of PBL have any important influence on them except keeping them awake in class. This difference may be caused by distinct cultural contexts of China and the UK. In British classrooms, students often develop a closer relationship with their teachers because of their frequent interaction in and after class. While in China, teachers usually distance themselves from students to maintain their authority, leading to less communication with students. In PBL classes, however, the traditional relationship between Chinese teachers and students are changed to resemble British style, thus causing greater implications on Chinese students and enhancing their motivation.

Finally, although the University of Bristol has a longer history of PBL implementation than Zhengzhou University which has PBL experience of only four years, more students from Zhengzhou university reported satisfied with PBL than from University of Bristol. According to the results on the Likert Scale, only two students from Zhengzhou University gave 'neutral' on the quality of group work and 'satisfied' or 'very satisfied' on other items. In contrast, students from the University of Bristol chose 'neutral' or even 'unsatisfied' on help from tutors, the quality of group work and the knowledge learned from PBL.

## 5. Conclusion

This study reveals that students from both universities are overall satisfied with PBL because of its contribution to deeper understanding of medical knowledge and skill development and they all think that the quality of group discussion and the efficiency of PBL classes need to be improved. In terms of the different views from two universities, when it comes to the biggest benefit of PBL, students from Zhengzhou University are more likely to choose clinical thinking because of its link with their current work, while students from the University of Bristol are more satisfied with the deep understanding on medical knowledge. Unexpectedly, although Zhengzhou University has implemented PBL for fewer years than the University of Bristol, students are more satisfied with and motivated in PBL classes than those of the University of Bristol. Due to the fact there is little literature focusing on the comparative attitudes of students in China and the UK, all the differences between the two universities are new evidence into the academic literature.

Based on the study, the two universities need to find how to motivate students' participation in group discussion to achieve better implementation results. With the high satisfaction of PBL among students, other universities should consider using PBL in medical education. A future study might be designed on more participants and comparison between genders differences.

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