A Study of the Implementation of
a Problem-Based Learning Approach
in University Classes in Vietnam

A thesis submitted in the total fulfilment of the requirements
for the degree of Doctor of Philosophy

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Declaration

I declare that this study is my own work and has not been submitted, in whole or in part, for another degree in any institution.

I declare that any information cited from the published or unpublished work written by others has been acknowledged in the text and a bibliography has been provided.

Danh Duc Nguyen

Signed

Date: 24 November, 2009
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ABSTRACT

In a period of significant global scientific and technological change tertiary students need to be more adequately prepared to effectively integrate into the competitive working environments of the 21st century. For this reason, these students need to be educated to use a variety of skills such as problem-solving and teamwork to support them in their future working conditions. These skills can be acquired through the use of a range of innovative approaches. A variety of these approaches is being introduced in a range of university courses in different institutions in the western world, including problem-based learning (PBL). The problem-based learning approach is also now being introduced to more traditional learning environments in Asian institutions such as Singapore and Malaysia. My study extends this innovative pedagogical approach, exploring the implementation of a PBL approach across a number of undergraduate classes in two universities in the South of Vietnam. It also reports on the students’ perspectives in learning through a PBL approach.

This study examines the impact of a PBL approach when it was introduced in a range of Vietnamese undergraduate courses. A group of eleven university teachers in two universities in the South of Vietnam were approached by the investigator and agreed to be involved in the study as individual cases for investigation. The teachers implemented a PBL approach to teaching in one of their undergraduate classes. In addition, 182 students from eleven different classes where a PBL approach was implemented agreed to discuss their perceptions of this shift in their learning approach.
Questionnaires and interviews were conducted with both the teachers and their students for the purpose of gathering data related to the impact of the PBL approach on the student and staff experiences. The study shows that Vietnamese teachers and students effectively adopted a PBL approach, and they commented on the worth of PBL for their teaching and learning. Both the teaching staff and students engaged willingly with the PBL approach. Although some assessment approaches were used that reflected the focus of PBL, there was still a heavy reliance on testing as the major form of assessment.

The study is expected to contribute to Vietnamese education by providing an evaluation of the PBL implementation processes. The examination of all aspects of PBL implementation has the potential to provide educators with a critical analysis of the processes in order to support their understandings when making the decision to broaden the teaching and learning approaches currently used. Further, the study affirms the implementation of PBL as a significant contribution in preparing learners to negotiate complex demands of the 21st century.
CHAPTER 1
INTRODUCTION

1.1. Background

According to Sternberg (1998), “instruction should be geared not just toward imparting a knowledge base, but toward developing reflective, analytical, creative, and practical thinking with a knowledge base. Students learn better when they think to learn ...They also learn better when teaching takes into account their diverse styles of learning and thinking” (p.18). The essence of learning is learning how to learn and learning how to think in order to meet the demands of the 21st century. In particular, learners should be prepared to work in different environments with many complex requirements. However, lecture-based learning approaches which are content-driven have been dominant in most classrooms in traditional tertiary education. These traditional approaches were seen to be appropriate approaches in the past for preparing tertiary students for their future working environments. These conventional methods of instruction have been found to not fully prepare students with the skills and attributes they require in their future working environments. Conventional methods of teaching often fail to motivate students in the learning process or support them to become active learners (Duch, Groh, & Allen, 2001). However, these traditional approaches are still being widely used today in institutions, one reason being the undeniable economic benefits they bring to the tertiary education. Specifically, traditional approaches can be used with large classes which results in creating a large numbers of tertiary graduates over a period of time.
1.1.1. Vietnamese educational overview (207 – 1975)

In this section, I will investigate the history of Vietnamese higher education system in the past decades to have an overview of tertiary education of Vietnam, especially its educational approaches. Understanding of the educational approaches traditionally used helps me seek ways to improve teaching and learning approaches currently used in tertiary education in Vietnam.

According to Pham and Fry (2004), Vietnam has a long history of higher education which has been influenced by education from countries such as China, France and Russia, but it is attempting to build its own higher education system. Particularly, Vietnam was dominated by Chinese regimes over one thousand years and became independent from Chinese feudal dynasties in 938. Therefore, Vietnamese education during the feudal time was much influenced by Chinese dynasties’ education. For example, Chinese characters were used in Vietnam for seventeen centuries.

Pham and Fry (2004) also assert the French navy attacked and invaded Danang-Vietnam in 1847 and since then Vietnam became a French colony. Vietnamese feudal dynasty which was under new control of the French still governed the country. However, Vietnamese education was not very innovative despite attempts to bring about change. A report by Nguyen Truong To calling for a shift in pedagogy and methodology in 1867 was introduced, but it was not supported by Vietnamese feudal dynasty at that time. In addition, a feudal education system existed in Vietnam until 1917 when the Confucian system was eliminated by the French. Nguyen (1995) claims that a group of Vietnamese scholars such as Phan Chau Trinh and Huynh Thuc
Khang complained about the old methods of learning and suggested theoretical and practical learning. When Vietnam became a French colony, the transformation of Vietnamese education into the French education system happened after 1917 (Nguyen & Phan, 2000). However, this transformation established a breakthrough for Vietnamese higher education. In particular, Vietnamese developed by a French missionary and scholar Alexandre de Rhodes was introduced in Vietnamese primary schools in 1919 and it was used at all levels of Vietnamese education after 1945 when the August Revolution of 1945 broke out and the Democratic Republic of Vietnam was established. The French, however, came back after a short time and colonised Vietnam until 1954. Pham and Fry (2004) reported that Vietnam was divided into two regions which were controlled by the French and the Vietminh, a Vietnamese liberation force. During this period, the French programs were taught in the education system of the French-controlled area. In the Vietminh-controlled area, the educational system was run by the Vietminh government.

Vietnamese education was transformed to another stage when the Vietminh won the war against the French in 1954. The Vietminh-controlled area in the north became the Democratic Republic of Vietnam and the prior area under the French control in the south was established as the Republic of Vietnam, protected by United States military forces. During the 1954 - 1975 period, the education system in the north was influenced by the Soviet Union and the medium of higher education was Vietnamese. However, the education system in the south of Vietnam was based on that of the United States and the language of instruction in higher education in the south was French, Vietnamese and English.
1.1.2. Vietnamese educational overview (1975 – present)

The north and the south of Vietnam were reunified to become one country in 1975 and the Ministry of Education and Training (MOET) was established to manage the education system of the country. The education system was still influenced by the Soviet system of education. Particularly, Russian was widely taught in Vietnamese schools and universities as a second language. However, when the system of socialist countries like Soviet Union and Eastern Europe collapsed, Vietnamese universities were changed by implementing curricular materials from the western countries like the United States and Western European nations. In particular, Vietnamese curricular and teaching and learning approaches have been influenced by Western countries. Further, English has been selected as a second foreign language in universities by a large number of students (Pham & Fry, 2004).

Notwithstanding western influences, current approaches to teaching in Vietnam mainly follow traditional and teacher-centred teaching approaches such as lecture-based learning. According to Pham & Fry (2004),

*In recent years, the Ministry of Education and Training, as well as many universities, have expressed concern about this problem. Typically, students are not being taught according to innovative progressive pedagogy. In class, students still passively take in the lecturers’ knowledge and are required to write down and follow every instruction from the lecturer. Accordingly, students often do not have opportunity to research documents on their own or*
engage in practice-based learning. Consequently, it is difficult for universities to produce high-quality students (p.315).

The use of traditional teaching and learning approaches in Vietnamese tertiary education has resulted in creating generations of Vietnamese graduates who find it difficult to be successful in Vietnamese working environments of the 21st century. These graduates are not prepared with a range of necessary working skills such as problem-solving, critical thinking and self-direction that they may not acquire through traditional approaches. Specifically, many Vietnamese graduates have fewer job opportunities in multinational settings as they cannot satisfy a range of job requirements (reported by Tran Quoc Toan, 2008).

The effects of the use of these traditional approaches are also limiting in helping students achieve the learning outcomes required for modern working environments which expect their workers to have a range of skills in order to fulfil their work requirements. Therefore, the Vietnam government is now encouraging educators to seek ways of improving the education system, especially through using diverse teaching and learning approaches so that the quality of Vietnamese tertiary education might be enhanced. In particular, Tran Quoc Toan (2008) reported that Vietnamese Prime Minister Nguyen Tan Dung encouraged the educators to implement innovative approaches in their teaching in order that students could have opportunities to develop their creativity and working skills. In addition, in a report by Tran Quang Quy (2008), Vietnamese Minister of Education and Training Nguyen Thien Nhan, urged the educators to apply new educational strategies in their education for the enhancement of education quality.
1.2. Scope for problem-based learning (PBL)

According to Duch, Groh and Allen (2001), “Lecturing is still efficient and has persisted as the traditional teaching method largely because it is familiar, easy and how we learned. It does little, however, to foster the development of process skills to complement content knowledge” (p.5). In fact, conventional teaching approaches like lectures have a long history in tertiary education, and they have contributed to the education of tertiary students for the past centuries. However, these traditional teaching approaches may be limiting in current higher education which is expected to educate students to become effective workers. Present tertiary education, especially in Western countries, is implementing more innovative teaching methods to encourage students to actively engage in the learning process as well as to educate them to become self-directed learners and successful problem solvers in future working environments. Further, a variety of innovative teaching approaches has been introduced into tertiary education to support university students in their learning. For example, according to Nguyen & Meier (2007), the Harvard Business School in Boston implemented case study in 1908 in educating business students to prepare them to become skilled company economists. Also, American educators constructed the theory of project method early the 20th century. This method is seen as one of the learner-centred methods used in tertiary education to limit the shortcomings when using traditional teacher-centred methods like lecture-based learning (Nguyen & Meier, 2007).
One such learner-centred approach is problem-based learning (PBL) which is recognised as a significant improvement to teaching for professions (Boud & Feletti, 1991). With the learning outcomes of both subject content and processing skills, learners can increase their understandings as well as learn how to learn during the process of a PBL approach. Moreover, Delisle (1997) claims that “students who were taught through PBL became self-directed learners with the desire to know and learn, the ability to formulate their needs as learners, the ability to select and use the best available resources to satisfy their needs” (p.3). Comparing problem-based learning with the traditional approaches such as lecture-based learning, PBL better prepares learners for their future careers in competitive working environments requiring teamwork. This study argues that implementing a PBL approach in teaching will support learners to become better problem solvers and acquire a greater range of useful skills.

1.3. Objectives of the study.

A fast-changing world requires changes in different aspects of its system, especially in education. In particular, it expects its learners to have new skills, understanding and knowledge to meet changing environments. As a part of the world, Vietnam aims to integrate with the world in many fields, such as economy and education. However, the Vietnam education system, especially in tertiary education, has still mainly embraced traditional learning approaches which prevent them from enhancing the educational quality of Vietnam.

My study aims to support change by in turn underpinning Vietnamese university teachers’ attempts to move from giving set information to students towards supporting
students to engage in finding solutions to given problems in a range of their university courses such as English Literature, Business (Finance/Industry Administration), Psychology (Introductory/Development), Introductory Education and Vietnamese Literature. I am interested in further investigating implementing a PBL approach across a range of university courses in Vietnam and examining the impact of this approach on the teaching of the teachers and the learning of students.

My study, through dissemination of its findings, aims to broaden the range of teaching and learning approaches used in Vietnamese universities through the introduction of a PBL approach into a number of university classes. The more detailed objectives of this research include the following:

1. To explore the experiences of eleven university lecturers who implement a PBL approach in a range of courses in two universities in the South of Vietnam.

2. To understand the benefits and challenges of implementing a PBL approach from the perspectives of the university lecturers.

3. To discover the effects of the implementation of a PBL approach in supporting the learning of 182 university students in Vietnam from the perspectives of the students.

To achieve the above objectives, my study aims to answer the following questions:
1. What understanding did Vietnamese university teachers have of PBL prior to their involvement in the study?

2. How did Vietnamese university teachers implement a PBL approach in their classes?

3. What impact did the introduction of a PBL approach have on Vietnamese university teachers’ teaching?

4. What impact did the introduction of a PBL approach have on Vietnamese university students’ learning experience?

5. As a result of the introduction of a PBL approach, what impact will the approach have on Vietnamese university staff’s future curriculum planning?

1.4. Overview of the research.

The literature review presented in Chapter 2 will discuss the teaching and learning approaches used at university level and how they support students to work in a changing knowledge economy. It also examines teaching and learning theories that support the implementation of a problem-based learning approach. Also, I will discuss a history of PBL and its introduction into teaching in numerous institutions throughout the world. The history of the introduction of PBL into different professional fields such as medicine, business, sciences, agriculture and education will provide the background for my study.
In addition, I will examine the range of strategies involved in implementing a PBL approach throughout the literature as well as the possible benefits and any disadvantages or difficulties reported regarding using a PBL approach. I will use the literature review to inform the implementation of using the PBL approach in a range of university classes in Vietnam in the research that follows.
CHAPTER 2
LITERATURE REVIEW

The literature review will focus on examining a problem-based learning (PBL) approach as it is used in a range of university settings. I will discuss issues related to teaching and learning at the university level and how they equip students to work in a changing knowledge economy worldwide as well as in Vietnam. I will also discuss the theories of teaching and learning. In particular, I outline the history of PBL and this is followed by a discussion about the benefits as well as disadvantages of the approach. Moreover, I will discuss the features of PBL approach together with the steps in the process of implementation of a PBL approach. I will also examine the roles of students and teachers in PBL classes along with assessment styles used in the process of the PBL implementation. The literature review will conclude with a discussion of the range of PBL models currently used. I will then link the literature and the approach for designing and implementing the research within the study.

2.1. Learning and teaching at the university level for a changing knowledge economy.

Higher education in a changing knowledge economy is important in helping maintain the growth by educating highly-skilled graduates for the economy. Peters (2007) asserts that “new growth economy has highlighted the role of education in creation of human capital and in the production of new knowledge and explored the possibilities of education-related externalities” (p.132). In addition, the knowledge economy gradually depends on new learning processes such as problem-solving, critical
thinking and creativity. The importance of the development of a “learning culture” is also introduced as a “long formal education, repeated re-education and retaining, and even life-long education” (Peters, 2007, p. 132). However, although the impact of the socioeconomic changes enhances the transformation of education, the process of educational change is rather challenging. Schon (1971) asserts that real change may result in an experience such as “the situation of being at sea, of being lost, of confronting more information than you can handle” (p.12). Fullan (2007) adds “real change, whether desired or not, represents a serious personal and collective experience characterised by ambivalence and uncertainty” but the results of the change can lead to “a sense of mastery, accomplishment, and professional growth” (p.22).

According to Fullan (2007), educational change is seen as a change in practice which can take place at different levels, such as the teacher, the school, the school district or the nation. Educational change is difficult because it does not comprise a single component, such as innovation in a classroom. In particular, innovation itself is “multidimensional”. In implementing any new program, “there are at least three elements or dimensions at stake” such as “the possible use of new or revised materials (instructional resources: curriculum materials or technologies), the possible use of teaching approaches (new teaching strategies or activities) and the possible alternation of beliefs (pedagogical assumptions and theories underlying particular policies or programs)” (p. 30). Further, a teacher can implement one, two or all three dimensions in his/her class. For example, the teacher can implement an innovative teaching approach in teaching an old curriculum to come to grips with his/her students’ perceptions in learning through the approach. In addition, a range of difficulties
should be considered during the process of educational change, such as the implementation of the three dimensions. The difficulties could arise from the determining of the objective dimensions of change in respect to “materials, teaching approach and beliefs, because they may get transformed, further developed, or otherwise altered during the implementation” (Fullan, 2007, p. 31).

Additionally, a changing knowledge economy constantly requires its employees to have innovative skills such as problem solving and team working to satisfy the job requirements. However, making a change in education is a challenging process. Also, this educational change process may experience a range of difficulties as outlined by Fullan (2007). The process of education change consists of many phases such as “adoption” (a decision to adopt a change), “implementation” (putting an idea/reform into practice) and “continuation/institutionalisation” (determining a success or failure of the change) (p.65).

Des Marchais (1993) reported his five year experience in implementing a PBL approach in the University of Sherbrooke’s school of medicine. He argues that “the PBL program is more demanding of teachers and requires better faculty training in pedagogy”. However, “the Sherbrooke experience has demonstrated that it is both possible and feasible to shift from a traditional to a problem-based curriculum”.

Vietnam is hoping to create a work force of skilled graduates for the development of the country’s economy. The Sixth Party Congress in 1986 introduced a policy of socio-economic reform which focused on the role of private enterprise, administrative decentralisation and the promotion of economic, cultural and technological links with
the world. Socio-economic reforms put pressure on Vietnamese education system to create qualified graduates for Vietnam (Fahey, 1996).

Economic development in Vietnam requires its education system to increase the education participation in order to create a skilled work force for the labour market. Fahey (1996) asserts that Vietnamese economic reform results in a change of job opportunities which is described as a mismatch between Vietnamese graduates’ skills and necessary working skills required by the Western multinationals. For example, the teaching of Russian as a foreign language rather than English limits the graduates’ job opportunities in Western multinationals. “Few higher education institutions currently provide adequate skills training necessary for the manufacturing and service industries of the future” and the weaknesses of Vietnamese higher education system cause university staff to have fewer opportunities to update their specialisation or implement innovative teaching and learning approaches (Fahey, 1996, p8).

It is clear that the Vietnamese education system has to make changes, especially in higher education, in order to help the development of the economy. This education change should result in preparing Vietnamese students to adapt easily to new working environments in Vietnam as well as worldwide. Hoang (2007) asserts that making changes in Vietnamese higher education is a must which is strongly expected from Vietnamese people. As a result of this, a dramatic expansion has been made in the Vietnamese education system. This educational expansion aims to enhance and maintain the development of new demands of the economy and to meet social demand for higher education to create skilled employees for the labour market (Pham & Fry, 2004).
A number of recent studies aiming to enhance the higher education in Vietnam has been conducted. Nguyen, Nguyen and Duong (1997) introduce the application of PBL in *Theories of chemistry teaching*. In addition, in a course book for further training of Vietnamese high school teachers, Nguyen (1996) asserts that a teacher should promote students’ eagerness and self-directedness in the teaching and learning process. Also, Vu and Tran (1996) argue that problem-solving learning is an innovative approach recently introduced through Vietnamese education and training. Theories of innovative approaches such as problem-solving learning have been recently introduced to a variety of educational workshops in Vietnam, but the implementation of these innovative approaches in Vietnamese education system is still limited because of issues related to educational facilities, resources and management.

2.2. **Theories of teaching and learning.**

According to Pritchard (2005), “learning is a vast and complex subject” (p.5). Importantly, to be successful in education, a teacher should have an understanding of a range of teaching and learning theories such as behavioural, constructive and cognitive learning.

A significant theory of teaching and learning is constructivism which “is a psychological and philosophical perspective contending that individuals form or construct much of what they learn and understand”. Constructivist theory is much influenced from studies involved in human development, “especially the theories of
Piaget and Vygotsky” (Schunk, 2008, p. 235). In addition, Piaget and Vygotsky supposed that learners dynamically build their own knowledge and perception. In particular, Vygotsky focused on the social participation of the learner while Piaget centred on the learner’s inner motivation to balance new knowledge with prior knowledge and understanding (Schunk, 2008).

Additionally, there is a variety of differences between constructivist theories of Piaget and Vygotsky. Piaget’s theory of cognitive growth is based on issues related biology, age and development of the learners. However, Vygotsky’s constructivist theory emphasizes the learners’ social interaction which is not strictly age-related (Pritchard, 2005). Importantly, Vygotsky’ theory of social constructivism focuses on the Zone of Proximal Development (ZPD), and when the learners collaboratively work in the ZPD, development is achieved. ZPD is “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). Also, it is a theoretical zone of understanding described as above the individual learner’s level of understanding. Working collaboratively in the ZPD with teacher support, the learner will gain the knowledge incorporated in the ZPD learning.

According to Schunk (2008), Vygotsky’s theory of social constructivism can be used in a range of educational applications. The first application is the so-called instructional scaffolding which is the process where the teacher provides support for the learners when they are involved in learning within their ZPD. In addition, the instructional scaffolding can function as “providing support, functioning as a tool,
extending of the learner, permitting the attainment of tasks not otherwise possible or using selectively only as needed” (p. 247). Next, the theory of social constructivism can be applied in education as reciprocal teaching which promotes an interaction and discussion between an instructor and small group of learners. Additionally, peer collaboration is another educational application of the theory. This encourages the learners to actively work on their assigned task and to learn from each other while collaborating with their peers.

PBL is a constructivist process, so understanding of constructivist theories is necessary in implementing the PBL approach. Savin-Baden and Major (2004) assert that investigating how the learners learn and what is going on in the learners’ minds are what cognitive theorists are researching. This is aimed at enhancing learning productivity. For example, Vygotsky’s social constructivism which stresses the importance of the ZPD and teacher’s instructional scaffolding in helping learners attain new knowledge can be seen as one of the frameworks for PBL implementation.

Furthermore, Savin-Baden and Major (2004) also mention the humanist theories of Maslow (1968) in relation to the implementation of a PBL approach. The theories asserted a hierarchy of needs that ranged from biological and physiological needs, safety needs, belonging and love, esteem needs to self-actualisation. In a PBL approach, students are able to have their diverse individual needs recognised, respected and developed in the processes.

Learning will be improved if a teacher has understandings of the learning theories and knows how to incorporate these theories into the learning processes. For example, in
implementing a PBL approach, designing effective learning problems which attract students’ interests is important. To do this, the facilitator should attend to students’ background and build on this through scaffolding learning. Importantly, the process of the teacher’s facilitation in a PBL class is seen as guiding student cognition. So, PBL implementation will be more successful if the facilitators understand how to incorporate the teaching and learning theories into their practice.

Knowles, Holton & Swanson (2005) assert that the two streams implemented in adult education are the scientific stream and the artistic or intuitive/reflective stream. The scientific stream discusses the adults’ ways of learning new knowledge through experimental investigation while the other stream focuses on the ways the adults “discover new knowledge through intuition and the analysis of experience” (p.37). A problem-based learning approach provides the opportunity for adult learner to use their intuition and analyses experiences.

2.3. Problem-based learning as an innovative approach

2.3.1. The origins of the PBL approach.

According to Martin (1996), PBL first appeared in medical schools at Case Western Reserve University in the United States in the 1950s, but it was officially introduced as a methodology by Howard Barrows at McMaster University in Ontario, Canada in the late 1960s (Boud & Feletti, 1991; Delisle, 1997; Magnussen, Ishida, & Itano, 2000). The PBL approach was used to enhance the quality of medical education by moving from a subject and lecture-based curriculum to an integrated curriculum
structured through real-world problems which cross traditional boundaries. Also, PBL is rooted in the “project method” of William Kilpatrick (Kain, 2003). Kilpatrick asserted that learners should not be provided with answers but rather with experiences in learning to help them create the questions and to seek solutions to questions and problems.

According to Rhem (1998), the intellectual history of PBL is far older. PBL is seen as a newly recovered style of learning, relating to the question-and-answer dialectical strategy associated with Socrates and the Hegelian thesis-antithesis-synthesis dialectic.

Cited from the address by Barrows and Tamblyn (1980), Savin-Baden and Major (2004) claim that the early classic form of PBL has characteristics of a real-world problem which has a variety of possible solutions and this is centred on the learning situation. Organised groups discuss what is known about the problem as well as determine the information gaps within the given problems. In finding solutions to the learning problems, the learners will achieve learning outcomes embedded in the given situations. With PBL, teaching staff play a role as facilitators providing assistance and guidance for the learners during the problem solving process, and self-directed learning is therefore promoted. Moreover, PBL is not considered as a particular method of learning, but it can be seen as taking of a variety of models. The differences are determined by the nature of the subject and the objectives of the course (Savin-Baden & Major, 2004).
Since its official introduction at McMaster University, Canada, PBL has been implemented mainly in medical schools. Opinions vary over whether PBL should be applied to entire courses or whether it should be used merely to teach certain parts of courses (Rhem, 1998). PBL has been implemented in various areas of study, including dentistry, pharmacy, optometry, nursing, law, business and education (Ahlfeldt, Mehta, & Sellnow, 2005). The University of Delaware applied PBL in their curricula in 1992. Prior to this time, PBL had not been widely used by undergraduate lecturers. At this time, many lecturers had participated in PBL workshops which introduced the PBL application in nearly every discipline. Moreover, PBL was also introduced in other institutions throughout the United States, Australia, Europe, and South Africa (Duch, Groh & Allen, 2001).

In Australia, in 1978 the University of Newcastle established the medical school with a commitment to innovative teaching models and they implemented a PBL approach (Savin-Baden & Major, 2004). In addition, PBL has been widely used in areas such as engineering, legal education and teacher education. Previous research in education has argued that PBL supports student teachers in obtaining significant hypothetical concepts and helps them in learning to negotiate with others on a professional level (Murray-Harvey & Slee, 2000)

2.3.1.1. Problem-based learning in higher education

PBL has been introduced in the field of medical education for more than 40 years:

*The era that gave birth to problem-based learning was one in which there was an accelerated growth of technology and information as well as changing*
social attitudes. Dissatisfaction with traditional medical education and the need to address the changing social climate led to the development of a revolutionary new medical school curriculum (Saarinen-Rahiika, Binkley & Hayes, 1998, p.197).

Conventional approaches which had been used for a long time in higher education were recognised as limiting students to be good problem-solvers and self-directed learners in the information age. The early implementation of a PBL approach in medical education can be seen as one of the first innovative approaches used in higher education.

After the initial implementation of a PBL approach in medical education at McMaster University, it was also integrated into other fields such as occupational therapy (Royeen & Salvatori, 1997), physical therapy (Saarinen-Rahiika et al., 1998), and veterinary medicine (Edmondson, 1994). Through implementing a PBL approach, teachers have realised that learners engage in the professional world not only to answer the questions regarding the problem or to reach solutions, but also to research in ways that discover new explanations to problems that have not been answered. A PBL approach focuses on “the students…actively engaging in inquiry and problem solving” (Edens, 2000, p.56). In fact, PBL begins with an “ill-structured problem” which has diverse solutions and students are encouraged to actively engage in group work to find the tentative solutions for the problem. To do this, individual students as well as their group members have to collaborate by working out what they know, and what they need to know about the problem. Hence, students will determine what
learning resources they have to gather within the discipline or from other disciplines to solve the given problem.

In addition, Prince and Felder (2007) argue that PBL is one of the inductive teaching methods which come in a variety of forms such as discovery learning, inquiry-based learning, problem-based learning, project-based learning, case-based teaching and just-in-time teaching. In the inductive form of teaching, the teacher begins by introducing a learning challenge to learners, such as a case study to analyse, or an “ill-structured” problem to solve. The learners faced with the learning challenge will search for facts, skills and conceptual understanding to solve the learning problem under the teacher’s facilitation and guidance. Also, Prince and Felder (2007) assert that these inductive methods have something in common. It is that learners are introduced to a challenge and then they investigate what they need to learn to solve the problem. However, these teaching approaches also have some differences in the nature and scope of the problem and in the amount of help the facilitator provides for the learners when they attempt to solve the problem. Some characteristics of these inductive methods are detailed in the following table:

**Table a. Characteristics of inductive teaching methods**

<table>
<thead>
<tr>
<th>Inductive methods /inquiry-guided learning</th>
<th>Brief description</th>
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<tbody>
<tr>
<td>Learners are introduced to a challenge (question to be answered, an observation, or data set to be interpreted, or a hypothesis to be tested) and they complete the learning in the process of responding to that challenge (Prince &amp; ...</td>
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Colburn (2006) recommends focusing inquiry-based learning around problems which require experimental investigation, involve materials and situations slightly familiar to learners, and which will lead on to promoting skill development.

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<tr>
<th>Method</th>
<th>Description</th>
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<tbody>
<tr>
<td>Discovery learning</td>
<td>Learners are faced with the problem and left to work out the solution on their own (Bruner, 1961; French, 2006). The instructor may provide feedback in response to learner efforts but gives little or no involvement before or during those efforts. Thus, trial and error are the main features of discovering learning (Prince &amp; Felder, 2007).</td>
</tr>
<tr>
<td>Problem-based learning</td>
<td>Learners who are often working in teams are faced with an open-ended/ill-structured real world problem. The learners find alternative solutions which will be formulated and evaluated. Problem-based learning mainly focuses on the process of finding tentative solutions for the given problem (Prince &amp; Felder, 2007). “Problem-based learning is arguably the most difficult to implement of all the inductive teaching methods. It is time-consuming to construct authentic open-ended problems whose solution requires the full range of skills specified in the instructor’s learning objectives” (Prince &amp; Felder 2007, p.16).</td>
</tr>
<tr>
<td>Project-based learning</td>
<td>Learners are assigned to produce something such as a process and product design. They apply prior knowledge to complete the final product; this is the central focus of</td>
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2.3.1.2. Evaluating a problem-based learning approach

The introduction of problem-based learning in higher education has not only gained success in medical education but it has also been popularised and recognised in different major areas. For example, Ong (2000) asserts that PBL has been introduced

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<tr>
<td>Case-based teaching</td>
<td>Learners study historical or hypothetical cases involving scenarios which may present in professional practice. Learners solve the given problem by examining their existing preconceptions and adjusting them to accommodate the realities of the cases (Lundeberg, Levin &amp; Harrington, 1999). Cases seem to be relatively well-structured and rich in contextual details, and learners utilise what is already slightly familiar and build on this (Lohman, 2002).</td>
</tr>
<tr>
<td>Just-in-time teaching</td>
<td>Learners answer conceptual questions electronically prior to each class, and the facilitator modifies the lesson to respond to any misconceptions raised by learners’ responses to the questions. This approach may be demanding to implement as it requires preparation of conceptual questions before every class and a web-based course management system that can tabulate learners’ responses for the teacher to review (Prince &amp; Felder, 2007).</td>
</tr>
</tbody>
</table>
either partially or fully in the some non-health-science disciplines in different universities in Canada, Australia and the United States of America. For instance, PBL was renamed as Issue-based Learning (IBL) and implemented in Social Studies at the University of New South Wales, Australia, and the introduction of IBL has been such a great success that other educational institutions in New South Wales have implemented IBL in programs of Social Studies. In addition, PBL has been introduced in Engineering, History and Arts and Science such as Mathematics, Chemistry, Biochemistry, Physics, Biology and Computing. Particularly, PBL has been implemented in Legal Studies for a long time (Ong, 2000).

In addition, Williams (1999) reports on a three-year Australian undergraduate nursing program which implemented PBL and discovered a great improvement in student self-direction and the development of a holistic view of nursing. Nevertheless, researchers also discovered that learners were limited when performing psychomotor skills as well as lacking in fundamental knowledge of anatomy and physiology. Therefore, although the PBL implementation enhanced student self-direction, the program would need to be adjusted to improve other necessary skills.

Also, three different PBL programs examined by Dahlgren (2000) at Linkopings Universitet in Sweden provided a range of different objectives. The first was a Masters of Psychology program where the expected learning outcomes were clearly outlined. A student-centred process enabled the learners to examine the meaning of the objectives. This contrasted with a second trial in the Bachelor of Physiotherapy program which had an extensive, generic array of skills the learners needed to achieve that were outlined. At this point, the relationship between the content and the learning
process was difficult to understand. Learners were not engaged effectively in using these objectives. The final program that was examined was the Masters in Computer Engineering which provided learners with a detailed, content-specific list of objectives. This resulted in the list being difficult for the learners to understand because it was detailed like a checklist. This research was useful for determining the importance of evaluating different ways of introducing a PBL approach to a class. Dahlgren (2000) also asserts that “the relationship between the format of objectives provided by the faculty and how students deal with them in the learning process could also denote fragments of the different educational cultures within the three programs and how the meaning of problem-based learning is interpreted” (p.30). Therefore, it can be said that it is a very complex situation to evaluate the implementation of a problem-based learning because objectives can focus on process or content and the outcomes can be relative to the objectives.

In addition to the implementation of PBL in higher education, Barbian (2002) claims that the training of the Federal Bureau of Investigation (FBI) agents had been lecture-heavy and centred on the instructor who only imparted knowledge to trainees. For this reason, the FBI sought to shift the former instruction to a PBL approach in order for the agents to have better preparation for their daily job challenges and the study shows the changes of instruction have proved to be effective.

2.3.1.3. Studies of problem-based learning in Asian settings

The PBL approach has been introduced in the Asia-pacific region for over ten years (Khoo, 2003) in comparison with its official introduction at McMaster University,
Canada in 1960s. Achike and Nain (2005) assert that “the delay is attributable to such factors as the lack of leading regional PBL experts, conservative attitude with attendant resistance to change, and the long standing myth that Asians students are not suited to the PBL approach” (p.303). Moreover, teacher-student relationship in Asian countries, especially in Eastern cultures is described as hierarchical. Asian students tend to have blind respect for their teachers. They dare not raise questions in class and any students who risk doing this during their class time can be seen as impolite. Teachers in Eastern cultures can be seen as authoritarians who expect their students to be quiet and obedient in the classroom. This may be a result of Asian students tending to be passive in their class, and their Eastern cultures may prevent them from becoming more active and independent in the classroom (Khoo, 2000).

However, a variety of studies on implementing a PBL approach in Asian educational institutions have showed optimistic responses about using this innovative approach within Asian settings. Khoo (2003) claims “most Asian schools and their students appear to be positive about adapting to PBL in their curriculum. The positive and negative observations appear to be similar to those experienced in non-Asian medical schools” (p.401). In addition, Ho, Chan and Peng (2001) commented that students’ spontaneous participation was enhanced gradually when student groups which were not working effectively in previous discussions were assigned to smaller subgroups. In addition, Asian students can adjust their behaviour when being placed in a new learning setting (Khoo, 2003). A report from Ahn (1999) gives another example of Asian students’ cultural adaptation which described a group of Korean medical students on their summer course in a medical school in Canada. These students effectively adopted some features of Western cultures such as the openness and
enquiring attitudes from their Canadian counterparts. In addition, “the year 2000 inaugural conference in Singapore was open to all disciplines – including Accountancy and Law, and currently an annual meeting of PBL educators in all disciplines is in existence” as a result of this experience (Achike & Nain 2005, p. 303).

Another study of the implementation of problem-based learning examined four faculties of three Asian institutions: two in the University of Malaya, and one each in the Institute Teknologi Bandung, Indonesia and the University of Philippines by Hussain, Mamat, Salleh, Satt & Harland (2007). It showed that “student and tutor experiences were positive and PBL was seen to work extremely well, despite the typical problems that students can experience working in groups” (p.761). In addition, the study also described learners having opportunities to share their own research with their peers, which enhanced their self-confidence.

From the early implementation of a PBL approach in medical education at McMaster University in Ontario, Canada in 1969, PBL has been popularised in various disciplines in different institutions throughout the world. In addition, PBL has not only been successfully implemented in western educational institutions but it has also brought success from its application in eastern cultural education at Asian universities where the education system is seen to be more hierarchical.

Whenever a PBL approach is implemented in any disciplines in western or eastern cultural settings, its strong aim is to enhance educational quality. In particular, PBL practitioners all aim to educate their students to become self-directed learners who can
self-organise their present learning process as well as be self-directed in their study in a way that will lead to the acquisition of lifelong learning skills. However, the evaluative studies above highlight the danger of focusing only on the process skills. Williams (1999) states there was a lack of fundamental knowledge and skills when the process became the central focus and the crucial role of having clear objectives was also shown to determine the success of the PBL approach.

Overall, from its initial appearance, PBL has been introduced in a range of disciplines at different educational institutions in the world. The extent of the introduction of PBL into curricula also varied. It can be the whole program being designed as PBL (Boud & Feletti, 1997; Bridges & Hallinger, 1998) or PBL is implemented in the program at different points such as in the third or the fourth year in the undergraduate course (Solomon, Binkley & Stratford, 1996) or only in specific units (Bridges & Hallinger, 1998), or problems are only incorporated into units taught through lecture-based approach.

2.3.2. Elements of problem-based learning approach

2.3.2.1. The aims of a PBL approach

The implementation of a PBL approach is aimed at preparing students to become effective problem-solvers and self-directed learners. Therefore, learners taught with a PBL approach can develop a variety of skills which are useful for their present learning as well as for their future professional challenges. However, the
implementation must also lead to the desired objectives and result in the understandings necessary for the discipline.

Barrows and Tamblyn (1980) argue that PBL can, regardless of discipline, enhance students’ success in relation to adaptation and participation in change; application of problem solving in new and future situations; creativity and critical thought; adoption of a holistic approach to problems and situations, appreciation of diverse viewpoints; successful team collaboration and identification of learning weaknesses and strengths. Moreover, students learning through a PBL approach can promote skills of self-directed learning; effective communication; augmentation of knowledge base and leadership and utilisation of relevant and varied resources.

I argue that the expected learning objectives in classes where the PBL approach is deployed need to be more specific and very clear in comparison with other traditional approaches. In particular, PBL classes are aimed to enhance students’ skills which are not only useful for their present learning process but for their future career. Therefore, it would appear that teachers who adopt a PBL approach to learning are interested in providing relevant real world problems. They also believe in empowering students to take some responsibility for their own learning. These teachers can also see the long term benefits of group work and of providing opportunities to practise problem-solving skills.

In another survey, Aspy, Aspy and Quimby (1993) and Ong (2000) quoted comparisons between PBL and lecture-based approaches. They claimed that mastery of content was equivalent in PBL classes to lecture-based approaches in short term
Although most studies show no considerable difference in the learning outcomes of science content gained between PBL students and their counterparts’ learning through a lecture-based approach (Albanese & Mitchell, 1993), there were higher scores in clinically-oriented exams by PBL learners (Vernon & Blake, 1993), and better long-term retention was seen in learners using a PBL approach (Farnsworth, 1994). Students learning through the setting of solving problems are seen to be more likely to apply the problem-solving skills attained to solve new problems than those who gained similar subject-content through conventional methods like lectures (Bransford, Franks, Vye, & Sherwood, 1989). Further, PBL learners have improved their professional skills more than those learning through a lecture-based approach (de Vries, Schmidt, & de Graaff, 1989). Lieux (1996) also asserts that a medical study showed that PBL students developed stronger skills of critical thinking, problem-solving, communication, and sense of personal responsibility when compared with those learning through the traditional methods.

In addition, Wood (2003) asserts that PBL promote “deep” learning. Students learning through a PBL approach know how to search appropriate learning materials for solving the given problems and therefore enhance their understanding. Students also apply their acquired knowledge in dealing with their daily activities. Moreover, PBL is a constructivist approach which encourages students to “activate” the gained knowledge and build it on from the new one (P5).

From these studies, I argue that learning through a PBL approach can better prepare learners for their future careers in the global working environment when compared with those instructed in a lecture-based approach. The skills of problem solving,
critical thinking, communication, and collaboration achieved from the process of learning through a PBL approach are likely to help graduates to become successful in confronting their daily working problems.

Nandi, Chan, Chan, Chan and Chan (2000) state that students learning through a PBL approach have more focus on meaning than reproduction. In addition, journals and online databases are used more often in gathering additional resources for solving problems in the learning process of PBL. However, the cost involved in PBL and conventional programmes was seen to be equivalent, so the expenditure involved in using the approaches was essentially the same.

Although results have been presented from a variety of studies comparing lecture-based learning and PBL approaches, the learning outcomes which can be seen as important to the success of using a teaching approach are often given greatest consideration most by educational evaluators. Lecture-based learning is more focused on the final examination of knowledge whilst the PBL sessions are mainly designed for assessing learners through the learning process. For this reason, students who are learning through a PBL approach can achieve increased knowledge and skills during the learning process.

2.3.2.2. Features of a PBL approach

PBL is a pedagogical strategy for posing significant, contextualised, real world situations, and resources, guidance, and instruction are provided to learners as they develop content knowledge and problem-solving skills to come up with tentative
solutions to the problem (Mayo, Donnelly, Nash, & Schwartz, 1993). Unlike traditional teaching, which is often conducted in lecture format, PBL teaching normally occurs within small groups of students facilitated by a faculty tutor (Aspy, Aspy & Quimby, 1993, Bridges & Hallinger, 1991).

According to Barrows (1996) and Gijselaers (1996), while content and structure of PBL courses may differ, the general goals and learning objectives tend to be similar. PBL begins with the assumption that learning is an active, integrated, and constructive process influenced by social and contextual factors. PBL is characterised by a learner-centred approach. PBL teachers work as facilitators who mainly provide scaffolding guidance in the learning process rather than being disseminators of knowledge. Also, open-ended/ill-structured problems are seen as the preliminary motivation and framework for learning (Wilkerson & Gijselaers, 1996). In PBL, facilitators are encouraged to promote learners’ intrinsic interest in the subject matter, emphasise learning as opposed to recall, promote group work, and help students actively engage in the process of finding additional learning resources to solve the given problem so that they will become self-directed learners. The “student-centred” approach allows learners to study those topics that interest them the most, and decide how they want to undertake the work. Gallagher (1997) and Reynolds (1997) assert that learners should identify their learning needs, help plan classes, lead class discussions, and assess their own work and that of their classmates.

According to Gijselaers (1996), PBL requires students to be metacognitively aware. This means that learners must identify what information they already know about the problem, and decide what information they need to know to solve the problem. This
helps learners become more effective problem-solvers and self-directed learners. According to Arambula-Greenfield (1996), instructors must play their role as a tutor or cognitive coach who models inquiry strategies, guides exploration, and helps students clarify and pursue their research questions.

One of the important features of PBL is group work. This helps develop learning communities in which students feel comfortable developing new ideas and raising new questions about the material (Allen, Duch, & Groh, 1996). Moreover, group work increases communication skills and students’ ability to manage group dynamics. It is also motivating for learners because they become actively involved in the work and are held accountable for their action by group members. However, groups are not always effective without the instructor’s guidance because many group members have not been trained in group work skills. For this reason, the teacher will often need to facilitate group interactions (Cohen, 1994).

Further, I argue that PBL students mainly work within their groups to solve their assigned problem under the teacher’s facilitation. So, it is important to guide students on how to work in groups and explain the roles that group members can take, such as the selection of the group leader, the recorder or the reporter for the group. These positions can be rotated amongst the group members after each problem so that every group member has equal opportunity to play the leadership role. Group work is an important factor in the implementation of a PBL approach as learning through group work helps students achieve the expected outcomes such as skills of self-directed learning, team-working, problem-solving and leadership.
Shelton and Smith (1998) assert that in the PBL literature the term “ill-structured” is used to describe open-ended problems that have multiple solutions. The problems require the learners to examine a range of different solutions closely before deciding on specific solutions. According to Gallagher (1997), ill-structured problems help learners to learn a series of key concepts, ideas, and techniques because they encourage group discussion and give students experience solving problems encountered by experts in the field. Furthermore, students recognise that the problems are professionally relevant. Students can be motivated to work on the problems because achievement from solving the problems is useful for their future career, both in terms of the knowledge gained as well as the problem solving skills attained through the learning process.

2.3.2.3. Disadvantages of problem-based learning

As well as many advantages of using a PBL approach being highlighted in the research, there are some barriers to using a PBL approach to improve learning. The role change from the “knowledge expert” to the facilitator is said to be untenable for many teachers. Boud and Feletti (1991) reported one of their teacher assistants said that “I can’t handle this. I want to be in total control and problem-based learning doesn’t allow that” (p.32). Moreover, it is challenging for teachers who have been accustomed to teaching using traditional methods to implement new learning methodologies that they have never experienced personally (Novak, 1990, Albion & Gibson, 2000). The limited materials prepared for PBL classes and few training resources can also be barriers to implementing a PBL approach. The theories of a PBL approach have been discussed widely. However, there is limited discussion on
the most effective steps or techniques designed for the implementation of PBL (Stepien, Sher, & Workmen, 1995, Burruss, 1999).

According to Wood (2003), “human resources” which require additional staff to support for group tutorials as well as facility resources such as working spaces, computers and libraries can be other challenges in the process of implementing a PBL approach. In addition, PBL learners are encouraged to highly promote their self-directed learning skills, they sometimes may be unsure what information is suitable to be gathered or how to effectively process the collected materials.

Assessment styles have traditionally been product-driven and knowledge-based whereas assessment in the PBL approach aims at assessing learners’ critical thinking and problem-solving skills. Meier, Hovde, and Meier (1996) assert that because of time limitation and administrative pressures to improve learners’ scores in standardised final tests, many teachers will not use any time to trial the use of a PBL approach.

These barriers are seen to be some of the issues preventing PBL from being popularised in different disciplines. Certainly, transference from traditional teaching using lectures to PBL requires teachers not only to alter their role as “knowledge experts” to “facilitators” but to redesign the course content as learning problems and assessment needs to consider the process as well as the product. It is said that it is easier for teachers to reproduce the conventional methods they had in their own education. Further, PBL learners are expected to engage in discussions of their own group work to seek tentative solutions for the given learning problems. Their learning performance which is based on many criteria is assessed throughout the learning
process. This form of assessment requires a great deal of teacher time and work, while standardised tests only expect learners to come up with the “right” answers to the problems. When assessment has traditionally been knowledge-based and product-driven PBL assessment presents another huge change in thinking on behalf of the teachers to trust an assessment system that measures different objectives using different processes.

Another issue around PBL implementation is the time used by both teachers and students outside of class. PBL facilitators need to spend more time than lecture-based teachers in preparing for their classes, especially in designing learning problems when they first implement the PBL approach. According to Bayard (1994), learners also have to spend more time outside of class for their PBL lessons and gather additional learning resources. When learning through a PBL approach, students are encouraged to work on their own or in their group to solve the learning problem. They sometimes study using the so-called conditions of “trial and error” and they may need more time for their independent learning. The implementation of a PBL approach can be time-consuming, but the reward is argued that students’ skills in problem solving and self-directed learning will be gradually developed. Bligh (1995) also comments on the issue of time-consumption in the implementation of a PBL approach. He argues that PBL is not expected to raise the teaching time but “rather to change how this time is spent” (p. 342) because facilitators implementing a PBL approach spend more time on working with their learners.

Although the implementation of PBL may have a variety of concerns such as learners’ inadequate preparation prior to their PBL sessions, ineffective group participation,
time-consuming nature or inappropriate depth of group discussions, these problems can be overcome by implementing a variety of strategies suggested from a study report by Vardi & Ciccarelli (2008). Particularly, they enhanced the implementation of PBL by introducing some learning strategies as follows: students were required to determine learning issues, gather resources and annotate problems before class and providing students with online resources or conceptual issues were uploaded prior to problem discussions.

2.3.3. The implementation of a PBL approach

The effective implementation of PBL depends on extensive and comprehensive preliminary development focusing on both the staff as facilitators and the instructional design processes that will lead to the production of problems and solutions. According to Boud and Feletti (1991), there is an expectation that students will become self-directed learners. When students first engage in the problem-based learning process, the tutor’s most important role is facilitative and supportive, and the support is gradually withdrawn as learners become accustomed to the PBL process. Other major preliminary tasks include that of instructional design, the preparation of learning problems and situations as well as the availability of additional resources and the development of scaffolding questions to support the investigations.
When implementing a PBL approach teachers need to understand that their involvement in student learning is to be gradually reduced during the learning process. On the other hand, this reduction in learning intervention has to motivate students in order that they take on more responsibility for their learning. At the beginning of PBL, the teachers can provide help when needed based on students’ prior learning experience. This help can be in the form of scaffolding questions which are aimed at encouraging students to carry out further investigations into the problem. When students gradually gain experience of learning through a PBL approach, this experience will be useful in helping them organise their learning related to new problems. In this way, the teacher needs to learn to stand aside, observing student learning from behind and only appearing to provide help in the form of scaffolding questions when requested. This gradually encourages students to become self-directed learners.

Another important feature in the implementation of a PBL approach is the incorporation of group work. This is compulsory as students working in groups have opportunities to participate in different learning activities. Brimble and Davis (2005) claim that if teachers incorporate group work, they will provide more opportunities for learner participation. In group work, learners have the opportunity to make their contribution to the work by doing their own research for their assigned work as well as making contributions to the group discussion. Also, it is through group discussions that the learners have opportunities to structure their own understandings based on their individual knowledge. More importantly, the group interaction enhances the students’ communication as well as it can build better relationships between students and their peers and between students and their facilitators. Johnson and Johnson
(1987) assert that groups can achieve their aims through collaboration, interaction and participation. Group members become the teachers to each other, rather than all students relying on one person, the teacher, to provide the information.

Brimble and Davis (2005) also discuss the role of group work in enhancing student participation. In this way, the class is seen as a context in which the tutor simply facilitates the learning interaction and the learners construct knowledge rather than the tutor imparting knowledge. Moreover, the adoption of a range of grouping practices is also encouraged as this will create opportunities for the students to improve socially by increasing their individual understanding and cultural perceptions while contributing to the success of the group. The students also have opportunities to collaborate and support one another during the learning process. As Brimble and Davis (2005) explain, flexibility of grouping is important. This can take the form of class discussion to enhance a sense of whole class unity, small groups to work collaboratively to seek tentative solutions for a problem together, and groups of two to promote one-to-one discussion or opportunities for students to work individually on their task.

The Problem-based Learning Assessment and Research Centre (PROBLARC) from Newcastle University propose the guide to Curriculum and Instructional Design for Problem-Based Learning (Little, 2000) to be used to support the implementation of PBL. The guide explains that the teaching situation commences with the simulation of an actual situation; the simulation is presented in the way it would present in reality. The facilitator assists the student to analyse the situation and identify the problem, identify relevant prior experience and knowledge, identify what knowledge is needed,
and identify potential resources needed to find solutions to the problem. In addition, the resources are identified to assist the learning, these include text material, people, specific skills/other classes, internet/database sources. Next, the situation is revisited and possible solutions are generated and evaluated. The facilitator monitors the desired knowledge, skills and applications used by the students. Finally, learning outcomes are assessed including the application and integration of knowledge, skills and applications as well as processes of analysis and self-directed learning.

Des Marchais (1993) reported his five year experience in implementing a PBL approach in the University of Sherbrooke’s school of medicine. He argues that “the PBL program is more demanding of teachers and requires better faculty training in pedagogy”. However, “the Sherbrooke experience has demonstrated that it is both possible and feasible to shift from a traditional to a problem-based curriculum”.

By understanding the characteristics of the implementation of PBL, I argue that teachers will be better prepared to become facilitators of learning, rather than providers of knowledge. It also helps the facilitator to design PBL processes appropriately and to create an active learning environment where students are helped to become self-directed learners.

3.3.1. Roles and responsibilities of teachers and students in the PBL process

3.3.1.1 Roles and responsibilities of teachers
When using a PBL approach, Bridges and Hallinger (1991) explain that the amount of direct instruction is reduced and students assume greater responsibility for their own learning. According to Vernon and Blake (1993), the instructor’s role becomes one of resource guide and the task and group consultant. This arrangement promotes group processing of information rather than an imparting of information by teachers.

The literature highlights the key role that the teacher plays in providing a successful PBL program. When implementing a PBL approach, the teacher has to make changes in ways of instruction, planning, learning direction, knowledge facilitation and assessment process (Torp and Sage, 1998; Gordon, Rogers and Comfort, 2001; Maxwell, Bellisimo and Mergendoller, 2001). The different roles taken by teachers can be seen as motivators which encourage students to be involved in the new learning environment and support students to become more self-directed learners.

Furthermore, in PBL classes, the facilitator’s role allows the teacher member to become a content and procedural resource person, a facilitator of group processes, a guide to additional resources, a sounding-board person and a learner him or herself. Instead of being the “sage on the stage” as often seen in traditional classes, the facilitator is now working as facilitator who models different ways of problem-solving (Brown, Collins, & Newman, 1989). To promote students’ self-direction in the learning process, the facilitator raises many meta-cognitive questions to encourage students to be engaged in discussion, rather than dictating how to solve the problem. The teacher does not get very involved in student discussion but rather, encourages students’ individual engagement in the group work. When observing a Canadian PBL class, Song, Kwan, Bian, Tai and Wu (2005) assert that although the class teacher was
an expert researcher in his teaching field, “he appeared to effectively refrain himself from lecturing or “steering” students’ direction of learning on this topic in the small group sessions” (p.383). Importantly, the PBL teacher provides students with learning advice when needed only. The advice is not the answers to the problems presented, but comprises further explanations to encourage students to work towards possible solutions to the problems.

Another change to the teacher role in PBL is that teachers need to learn the importance of connections between disciplines, as PBL is seen as an interdisciplinary approach. So, teachers need to cooperate with their colleagues in PBL for the success of the program (Meier, Hovde, and Meier, 1996; Maxwell et al., 2001). Teachers need to collaborate in designing learning problems which can be interdisciplinary. However, seeking support from colleagues in PBL situations is not always easy as some teachers are not willing to collaborate with PBL facilitators and they argue that PBL would not work for them. Successful implementation of PBL will require a paradigm change in teachers’ attitudes to learning before an interdisciplinary approach to PBL can be implemented in teaching processes. Some medical faculties use facilitators who are not content experts, so that the focus remains on good facilitation rather than content knowledge.

When commencing a PBL approach, the facilitators should provide students with considerable instructional scaffolding to help them improve their problem-solving skills, self-directed learning skills and group work skills. The scaffolding of the teacher can gradually be reduced. These skills are useful for students in the learning
process in seeking possible solutions for the learning problems given. These skills will also be developed through the learning process itself.

3.3.1.2 Roles and responsibilities of students

PBL contrasts considerably with the expectations placed on students during conventional teaching. Some students have difficulty with the concept and the elements of self-directed learning (Schmidt, Henry & de Vries, 1992). In PBL students must take responsibility for their own learning. They are encouraged to recognise their learning needs and determine the necessary learning resources they will need to help them navigate the learning situation and achieve their learning goals. This represents a change in thinking about the role of students.

Working in groups can support students’ comprehension of the learning problem and assists students to gain skills that will be useful in improving their communication skills. Moreover, skills of collaboration are very useful for students because they will most likely be working as team members in their future workplaces.

PBL students are encouraged by facilitators to learn to be active group members. They are advised to actively engage in the group work as well as in class discussions during the PBL process. It is through group work that students have opportunities to learn to both give and accept constructive criticism and find ways to reach agreement with classmates on difficult learning situations. As Brimble and Davis (2005) assert, using group work in PBL is a means of providing opportunities for learners to collaborate with each other, learn from one another and construct knowledge gained
from the learning interactions. Furthermore, when working in groups, students have to be responsible for completion of their assigned work. Also, students learn to honestly evaluate their own contributions and those of other group members as well as the whole group because their individual learning performance will be also assessed by their peers. In addition, PBL students need to play multiple roles such as leader, recorder, critic, discussant, teacher, researcher, presenter, communicator, problem solver and facilitator during PBL. Through playing diverse roles, students gradually acquire skills in team-work, communication and problem-solving. Individual students present their own task and work for the success of the group and no group member dominates the discussions.

Beside the role adjustments of teachers and students in PBL implementation, Achike (2003) asserts that administration support is also an important factor for the success of the PBL implementation. Although the departmental administrators are not directly involved in the process of PBL implementation, their support related to “administrative, financial, and political commitment” (p.93) is likely to influence the outcomes of the implementation.

2.3.3.2. Designing a PBL problem

The selection and development of learning situations, and their intrinsic problems in a PBL approach are extremely important. The problem itself is the crucial factor related to the success of PBL. Duch (1997) asserts that an effective problem has the following characteristics: first, it should be a real-world problem which attracts the students’ interest. They should be able to build on their prior knowledge and search
out additional resources during the learning process. Students should be encouraged through the problem situation to actively search for an understanding of the given problem. Next, the learning problem should be carefully designed in encouraging students to work collaboratively and use higher order thinking. It is recommended that the learning problem be open-ended to attract diverse responses, and draw on students’ prior learning, as well as involve contentious issues that will elicit a range of different opinions and contributions from students.

Another characteristic of a good learning problem is that the expected content outcomes of the course should be embedded in the learning problem and the new knowledge should be transferable to other disciplines as PBL is seen as an interdisciplinary approach. Searching different learning resources from a variety of related disciplines to solve the learning problems, students gradually gain the expected learning outcomes of the course and broaden their knowledge in other fields as well (Duch, 1997).

To design an effective learning problem, the PBL facilitators should have a thorough understanding of the discipline they are teaching as well as other disciplines related to the particular problem. This interdisciplinary knowledge helps the PBL facilitators in the process of problem design. It also helps them know how to guide students to find appropriate resources during the learning process.

According to Allen, Duch and Groh (1996), in designing ill-structured problems, these problems should create interest and controversy and encourage students to raise questions. Moreover, the ill-structured problems should have diverse solution paths
which attract students to actively engage in investigating all aspects of these tentative solutions using both their prior learning and new learning to defend these possible solutions. The problems are not only designed to lead students to explore a variety of solutions but they are also constructed in order to prevent learners from concluding that they have reached the “perfect” solution. By doing this, students are continuously encouraged to focus on the learning process by gathering additional resources to explain the different tentative solutions that arose.

Designing PBL problems is time-consuming. It also requires the teacher to regard many criteria in the process of problem design in order to effectively construct ill-structured problems. However, these effective learning problems can be rewarding in assisting students’ learning as they will be motivating, encouraging factors which attract students to be involved in the learning process and achieve the desired learning outcomes.

2.3.3.3. Organisation of the PBL class

To prepare for the implementation of a PBL approach, Dion (1996) suggests that the PBL facilitator should have a clear understanding of the purpose of implementing the approach, the procedures and the expectations. This is really useful for the teachers who are new to PBL. It also assists teachers to explain the PBL approach when students are first introduced to a PBL approach.

Facilitators also need to set clear guidelines for working in groups. It is necessary because working in groups. To manage the group work effectively, student groups
should be guided to work out the norms of their own groups. These group norms are seen as a consensus reached through the group’s discussions. Moreover, these norms are useful for attracting and recognising individuals’ contribution in the group as well as preventing any group member from not contributing (Dion, 1996).

Further, the groups are encouraged to set work for individuals as well as arrange the meeting schedule for their group. The facilitator will also introduce the schedule for the whole-class meeting where students are required to present their group’s work-in-progress reports.

In this way, the facilitators’ effective planning helps learners work collaboratively and effectively in finding tentative solutions for the problems and achieving the expected outcomes. Further, good organisation assists the teachers with group work facilitation.

2.3.3.4. Assessment in problem-based learning

The style of assessment which normally reflects students’ choices of “right” or “wrong” answers cannot be appropriately used in evaluating learners’ performance in learning through a PBL approach. Tchudi and Lafer (1996) claim conventional assessment is a game that asks the learner to guess what the teacher wants rather than perform the best they can. It is difficult to use traditional tests to assess the outcomes the learners gain from the learning through a PBL approach such as skills of problem-solving, critical thinking, creativity, self-directed learning, teamwork and communication.
Reynolds (1997) argues that PBL assessment needs to meet the philosophy of active learning instead of encouraging the learners to passively reproduce what has been memorised. Moreover, the process of PBL assessment must require the individual learners to analyse a problem, search for and then actively apply relevant information.

Traditional education often uses product-oriented techniques to assess students’ performance whilst the assessment used in PBL is more process-oriented. According to Toulmin (1972), however, process-oriented objectives can be difficult to articulate, though they comprise the “hidden curriculum” of most courses. These objectives are those that relate to how practitioners of a discipline or profession think about and solve problems within a certain field. The content-oriented objectives are usually emphasised. In problem-based learning practitioners may struggle with defining, highlighting to learners, and then assessing process-oriented objectives. However, those who have researched the process-oriented outcomes of problem-based learning have found good results (Hmelo, Gotterer, & Bransford, 1997).

Gallagher (1997) claims that assessments used in problem-based learning should be authentic. This means that the assessments should be structured in order that the learners can show their comprehension of the learning problems and their solutions in contextually-meaningful ways. The feedback the learners receive from their peers is also a critical part of assessment in problem-based learning. Furthermore, the learners can be assessed by their group members using a numerical scale based on “attendance, preparation for class, listening and communication skills, ability to bring new and relevant information to the group, and ability to support and improve the functioning of the group as a whole” (Allen, Duch, & Groh, 1996, p.49). Also,
Bridges and Hallinger (1996) assert that the peer assessment should be part of students’ final grades. In addition, the facilitator should supply detailed comments about each group member’s strengths and weaknesses. Learners’ self-evaluation can be a useful way to assess their own performance. It can be seen that peer assessment can be one of the effective strategies to engage students in their learning activities for a better group work result. This also helps students know their own contribution in relation to the outcomes of the whole group.

As PBL assessment is process-oriented it needs to be continuously conducted during the learning process, based on various criteria such as individual contribution, group and class participation, individuals’ self-assessment and group assessment, attendance and group presentation of tentative solutions to the problem. The greater the range of assessment processes used, the more possibilities there will be for the teacher to specifically support and assess the student learning.

To gain most from the PBL implementation, the steps of the implementation process have to be carefully prepared and facilitated. Also, an effective introduction of a PBL approach to learners, especially for those who are new to the approach, is really important as it helps students be ready to change from their traditional learning style to the innovative learning of actively engaging in group work. This transformation not only helps students attain the expected outcomes of the subject content but develops their learning and professional skills as well.

2.3.4. Models of problem-based learning approach
According to Savin-Baden and Major (2004), there are several discussions about models of PBL, with the pure model and the hybrid model seen as the most basic ones. The pure model is similar to the McMaster version of PBL with students working in groups and not having lectures or tutorials, while the hybrid model is one which includes lectures and tutorials. In reality, most of the present models of PBL in practice could be classified as the hybrid model.

Another claim made by Savin-Baden and Major (2004) is that the concept of modules or programmes can be different depending on the disciplines and cultures. The review of the following models can be seen as the common models of PBL currently used in undergraduate classes.

2.3.4.1 Single module approach

This approach is considered as the McMaster model where learners gather in groups to solve a learning problem related to one module of work. They are supported by facilitators in helping them solve a learning problem. In this approach, the facilitator acts as a resource for the group. Very few lectures are provided. There may not be a facilitator or tutor for individual groups; however, the learners have the chance to work on the problem on their own.

2.3.4.2 Problem-based learning on a shoestring
Table b. Example of problem-based learning on a shoestring. (adapted from Savin-Baden and Major, 2004, p. 38)

<table>
<thead>
<tr>
<th>Year</th>
<th>PBL</th>
<th>Lecture</th>
<th>Lecture</th>
<th>PBL</th>
<th>Lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>Lecture</td>
<td>PBL</td>
<td>Lecture</td>
<td>PBL</td>
<td>Lecture</td>
</tr>
<tr>
<td>Year 2</td>
<td>Lecture</td>
<td>PBL</td>
<td>Lecture</td>
<td>PBL</td>
<td>Lecture</td>
</tr>
<tr>
<td>Year 3</td>
<td>Lecture</td>
<td>Lecture</td>
<td>Lecture</td>
<td>PBL</td>
<td>PBL</td>
</tr>
</tbody>
</table>

This model of PBL is often implemented in scattered units during the module. It is seen as having a nominal cost and some facilitators interested in applying this approach in their classes can do so in a cheap and quiet way without impacting greatly on other staff members. With this model, the problem situations designed are based on the subjects or disciplines. Lectures can be scheduled as ways of guiding the learning. If there is lack of support from the department and institution, facilitators using this approach may experience frustration and the learners may not understand or value the rationale for its implementation (Savin-Baden & Major, 2004).

2.3.4.3 The funnel approach

This PBL form is considered as a way of learning designed to gradually direct the learners away from common conventional approaches towards a more innovative approach to learning like PBL. This means that lecture-based learning can be used for the first year student classes and a PBL approach will then be implemented in second year classes to make the learners familiar with the approach and funnel them to PBL in the final year of their university programme (Savin-Baden & Major, 2004).
2.3.4.4 The foundation approach

The foundation approach has the same structure as the funnel model. Although they have some similarities, initial lectures in the funnel approach are seen as early teaching steps to change the thinking of the learners towards a more innovative approach such as PBL. In the foundation approach, knowledge gained from the initial lectures will become foundational to acquiring other learning outcomes embedded in the problem situations to follow. In this way, basic concepts stored in the minds of the learners will be decontextualised for solving new problems later. In addition, in the foundation approach facilitators do not have to have such an active role in guiding learners to find the resources to solve the problems (Savin-Baden & Major, 2004).

2.3.4.5 The two-strand approach

With this approach, PBL is considered as an essential element of the programme aimed to make the best use of both PBL and other learning approaches concurrently. This approach can be implemented if there is a requirement from departments for learners to commence shared modules across disciplines. This means that modules in each strand are planned with linking topics in order that information attained from the mixed approach becomes a support for students in the PBL process (Savin-Baden & Major, 2004).

2.3.4.6 The patchwork PBL, the integrated approach and the complexity model.
According to Savin-Baden and Major (2004), the other approaches to PBL are the patchwork problem-based learning, the integrated approach and the complexity model. In these approaches, learners have to work on sequential problems across disciplinary boundaries. The most complex PBL form can be the complexity model used to design programmes “that transcend subjects, disciplines and university curriculum impositions, and embrace knowledge, self, actions and curriculum organising principles” (Savin-Baden & Major, 2004, p.43).

2.3.4.7 Other versions of the PBL approach

Duch (2001) has also introduced a variety of problem-based instruction models employed in undergraduate programmes. These include the “medical school model”, “floating facilitator model”, “peer tutor model”, and “large class model”. These models are seen to have similar features to that of the PBL approach originally used in medical schools except for the so-called floating facilitator model, as it is a model used with multiple groups of learners in large classes. The tutor, in this model, is considered as a “floating facilitator”, travelling between the groups to facilitate group work. Moreover, mini lectures and whole class discussions are also planned within the floating facilitator model. In addition, when PBL variations are implemented in large classes where there is a limited availability of tutors, multiple small groups can be facilitated by a staff member as “roving facilitator”. The facilitator who may or may not be a subject-expert can be a senior undergraduate student who is responsible for managing students’ group discussions.
From the discussion of the PBL models currently used, the model of PBL on a shoestring can be implemented easily. As discussed, this model of PBL can be used in scattered units during the module. Teachers can implement this model of PBL in teaching any learning units which can be problem-based, while units which are seen to be difficult to be set up as problem-based problems can be taught through lectures. Moreover, this model is seen to be suitable for the learners who are new to a PBL approach as the implementation of a PBL approach in scattered units will gradually accustom them to this approach. This model of PBL on a shoestring is also seen to be ideal to be implemented in a class which is only facilitated by a single tutor in faculties where there is limited staff. The facilitator can organise the teaching using both lectures and a PBL approach. With the model of PBL on a shoestring, the learning problems are designed based on the specific discipline and lectures can be scheduled as ways of facilitating the learning. I argue that the model of PBL on a shoestring is relevant to Vietnamese educational context where teachers can implement a PBL approach with nominal cost and in a quiet way. This model is also suitable for Vietnamese teachers who are new to PBL. I therefore chose it as the model to introduce for implementation for the study that follows. The teachers in the study teach in a range of disciplines and some have had no prior experience in implementing the PBL approach.

2.4. Using the literature review to clarify the focus of the research

The literature review commenced with a brief history of education in Vietnam to provide a context for the approach to teaching and learning that has been taken from the past to the present time. Emphasis was placed on the desire by some educators in Vietnam to change the current educational approaches, and try more similar
approaches to some western countries with the aim of improving a range of students’
skills of self-directed learning, problem-solving and collaboration and teamwork.

In addition, the literature review offers an understanding of a PBL approach, focusing
on the implementation of the approach in tertiary education setting. Specifically, the
literature review discusses the PBL approach from its first introduction in medical
education in McMaster University in Canada to its present form which is
implemented in an array of subjects and disciplines in different institutions in the
world. Although many aspects of PBL have been researched, the literature review of
this study discusses the reports of these studies investigated the implementation of a
PBL approach in tertiary education. I argue that this discussion supports my research
study which aims to investigate the implementation of PBL as a way to promote
positive teaching and learning in Vietnamese higher education settings.

Moreover, Vietnam is on the way to rapidly integrating with the world. To do this, the
provision of a skilled workforce for the competitive working environment is seen as a
must for the Vietnamese education system, especially in vocational and higher
education. Implementing a PBL approach to teaching Vietnamese tertiary students is
hoping to create generations of graduates who effectively engage in their educational
environment which will in turn help them to be effective in their working
environments. I will use aspects of these previous studies to inform the
implementation of a PBL approach in a range of university classes in Vietnam.

The chapter which follows details the research paradigm and design best suited for
my research study.
CHAPTER 3
METHODOLOGY

3.1. The research paradigm

Choosing an appropriate research paradigm for a study is important for any researcher. For instance, when discussing the qualitative research paradigm for a study, Hatch (2002) questioned that “What is qualitative research…What kinds of knowledge are foundational for understanding qualitative research? And what are the kinds of research that count as qualitative? (p.5).

A range of definitions of qualitative research have been introduced by qualitative researchers. Strauss and Corbin (1990) assert that “any kind of research that produces findings that are not arrived at by means of statistical procedures or other means of quantification” (p17). A more product-oriented definition of qualitative research by Bogdan and Taylor (1975) is “research procedures which produce descriptive data: people’s own written or spoken words and observable behaviour” (p.2). In addition, one of the characteristics of qualitative research is that it “seeks to understand the world from the perspectives of those living in it…Qualitative studies try to capture the perspectives that actors use as a basis for their actions in specific social settings” (Hatch, 2002, p.7). Given the definitions and characteristics of qualitative research, I argue that qualitative research is best suited for my study as my research objectives aimed to collect a range of rich data on teacher participants’ perceptions in
implementing a PBL approach and students’ perspectives on learning through the approach.

My qualitative approach fits a postpositivist paradigm for my research. Hatch (2002) asserts that postpositivists operate from the supposition that, because of the limitation of human investigation, the inherent order of the world can never be understood thoroughly. In addition, the postpositivists are critical realists who subject truth claims to close critical analysis in order to maximise chances of understanding the world as much as possible but never completely. In addition, with a postpositivist paradigm, researchers work to gather “close approximations of reality” (p.8) and they still keep their research position objective to what they are investigating (Hatch, 2002). Therefore, I expected to gather a range of rich data of teachers’ responses from their implementation of a PBL approach in their classes and students’ responses of their learning through the approach. In particular, the data collection mainly focused on investigating the relationships of the participants in the study (the teachers and the students) when they participated in the process of implementing a PBL approach in classes. The study also focused on exploring the roles of the participants during PBL sessions, the learning resources as well as the procedures used in the process of learning through a PBL approach.

I mostly used a qualitative research which helped to collect a range of rich data to enhance the results of the study as with qualitative approach, “the researcher relies on the views of participants, asks broad, general questions, collects data consisting largely of words (or text) from participants, describes and analyses the words for
themes, and conducts the inquiry in a subjective, biased manner” (Creswell, 2005, p.39).

I also used a quantitative approach in the study. Creswell (2005) asserts that in quantitative research “the researcher decides what to study, asks specific, narrow questions, collects numeric (numbered) data from participants, analyses the numbers using statistics, and conducts the inquiry in an unbiased, objectives manner” (p.39). I used quantitative approach to ask about a range of the participants’ perceptions by requiring them to complete several closed or multiple choice questions. In addition, I used the quantitative approach in my study to verify the tendencies of the implementation of a problem-based learning approach as well as categorise and make a statistical analysis of the teachers’ and the students’ perceptions in the implementation of a PBL approach.

The quantitative and qualitative approaches can be used with any study (Guba and Lincoln 1994). Moreover, Creswell (2005) further asserts that the approaches are mix-used to allow a better understanding of a study problem than a single type of data. “Mixed methods research has become popular as the newest approach to “mix” quantitative and qualitative research” (p. 509). I wanted to used the mixed-methods approach as I expected to “build on the strengths of both quantitative and qualitative data” of my study (p.510).

I wanted to focus predominantly on the qualitative approach to support my interpretation of the meaning of the teachers’ perceptions as well as students’ perspectives of learning through the PBL approach. The qualitative researcher is
concerned with reality as the researched perceives it (Burns, 1997). For this reason, participants in this qualitative study are given many open questions to comment on, rather than being asked about their responses by completing closed or multiple choice questions.

When using a qualitative approach the researcher relies on the perspectives of those being researched (Creswell, 2005). In addition, qualitative researchers tend to rely on the inductive mode of specific methods, and exploration or discovery is the key objective of the research. In addition, they hope to explore the world as it is, without appearing to control it (Johnson & Christensen, 2004). Qualitative researchers involve themselves in the particular situation being researched as they are concerned with understanding the context of their investigations. They believe that a better understanding can be reached when the context of the research is studied. For these reasons, I used qualitative research in the study with respect to attaining deep understandings from the research participants.

Moreover, the qualitative researchers focus on the process of the research rather than its outcomes (Bogdan & Biklen, 1998). From this, the qualitative investigators not only reach their research objectives but also learn the real changes or developments that the participants experience during the research period. I argue that using a qualitative approach in my study reflects the complexities of the process of implementing a PBL approach in a range of Vietnamese university classes, gathering responses from study participants.
According to Johnson and Christensen (2004), there are many kinds of qualitative research such as phenomenology, ethnography, case study and grounded theory. In addition, Yin (2003) and Merriam (1998) support postpositivist approaches to case study research and assert that this kind of research is a special approach of qualitative study which explores a contextualised current occurrence within particular boundaries. For these reasons, I used a case study methodology in this study to investigate the implementation of a problem-based learning approach into a range of university classes in Vietnam.

Creswell (2005) asserts that a case is seen as a “bounded system”. This means that the case researcher has to investigate the case researched as a “system” – “a set of interrelated elements that form an organized whole, and identify the outline or boundaries of that system” (p.376). Stake (2000) asserts that a case may be simple or complex; for instance, a child or a class of students can be a case. Moreover, a case study is investigated at both aspects: the process of inquiry about the case and the product of the inquiry. In this study, case study is interested in both the process and product of problem-based learning. The case comprises university teachers and students, seeking their perspectives on their involvement in the implementation process of a PBL approach to units of study.

According to Stake (1995), three different types of case studies include intrinsic case studies, instrumental case studies, and collective case studies. In collective case studies, the cases are concurrently investigated to obtain a better understanding about the research theme. This is the situation in this research study where university lecturers each implemented PBL and the researcher investigated the impact on the
different cases. In addition to collective case study, the researchers using collective case study are interested in investigating the impact of different cases rather than results in an individual case. Cases are also compared for similarities and differences which help researchers to build patterns and theories. However, as the breadth of analysis is conducted in multiple cases, the depth of analysis may be less focused due to the number of cases (Creswell, 2005).

With collective case study, the report can be arranged case by case, and includes a part combining the results from all of the cases (Creswell, 2005). In this study it is the approach taken where firstly the experiences of implementing PBL for each individual university lecturer was discussed along with the experiences of their students and this was then followed by an analysis which combined the information from the cases.

3.2. The research setting and participants

3.2.1 Research setting

According to Creswell (2005), case study researchers often choose non-probability sampling which is purposive or purposeful for their research. This means that the case(s) selected is for the actual purpose and objectives of the investigation. This study used a purposive sample of eleven university lecturers from two universities in the South of Vietnam who agreed to implement a problem-based learning approach in their university classes. The university setting was chosen for the implementation of the research because the Vietnamese government strongly promoted PBL (Tran Quoc
Toan, 2008 & Tran Quang Quy, 2008) as a way to enhance the present education system in Vietnam. The eleven university lecturers who agreed to participate in the study were from two different universities in the South of Vietnam, five from Ho Chi Minh City University of Pedagogy and six from Can Tho University.

Kelly (2000) in a report from the Institute of International Education/Vietnam asserts that there are over 200 universities and colleges in Vietnam. These institutions are classified as “specialised universities” each of which runs an area of study such as economics, education or law and “multi-disciplinary universities” which focus on different fields of study. Therefore, the choice of Can Tho University, a Vietnamese multi-disciplinary institution and Ho Chi Minh City University of Pedagogy, a Vietnamese specialised institution is seen as a small but diverse sample of Vietnamese universities. In addition, the lecturers chosen from two universities were from a range of different disciplines and each agreed to implement a PBL approach across their different university classes. The substantial number of classes or cases for this study was decided upon because I intended to gather a broad and rich range of data. Also, if any participants withdrew from the study, the number of cases would still remain viable.

To gather the range of rich data for the research, I used multiple techniques including two initial workshops which lasted three hours each to provide university staff with an understanding of the processes involved in a PBL approach. This was followed by the implementation of a PBL approach being implemented by eleven university staff members in eleven university classes. Following the implementation of PBL, I conducted surveys for lecturers and students and interviews with lecturers and
students to investigate teachers’ perceptions in implementing and students’ experience of learning through a PBL approach. Each component contributed to the validation process. All lecturer participants completed the teacher questionnaires and participated in the follow-up telephone interviews to discuss their perceptions in implementing a PBL approach. 182 student participants from eleven PBL classes also completed student questionnaires which explored their experience in learning through a PBL approach and eleven students were invited for the focus telephone interviews to further explain their learning experience of PBL. Details of the PBL workshops, teachers’ and students’ questionnaires and interview questions can be found in the following six phases:

Phase 1: Conducting two PBL workshops with 11 university teachers.
Phase 2: The process of the implementation of a PBL approach by the lecturers in their university classes.
Phase 3: Administering teacher questionnaires
Phase 4: Administering student questionnaires
Phase 5: Follow-up teacher interviews
Phase 6: Follow-up student interviews

I used triangulation to support the credibility and believability of the research (Leavitt, 1994). Triangulation improves the verification and validation of the qualitative analysis by checking the consistency of the results produced by the various data collection techniques (Burns, 1997). In this research, I checked the verification of the consistency of the data gathered by putting the data of the teacher questionnaire together with the data of teacher interviews as well as the data of the student questionnaire beside the data of student interviews to check for the content validity. I
also verified through utilisation of the same data sources (teachers/students) with different research methods (questionnaires and interviews).

### 3.2.2 Research location and timing

The study was conducted with the teaching staff and students who agreed to participate in the study from two universities in the South of Vietnam. The two universities are amongst the long-standing Vietnamese universities which have been recently chosen by Vietnamese government (Tran Quang Quy, 2008) to be involved in the process of decentralisation of Vietnamese higher education. Furthermore, it can be said that this study was timely because the Vietnamese government is promoting educational initiatives which add to the innovations taking place within the Vietnamese education system, especially in the development of teaching and learning in higher education (Tran Quang Quy, 2008 & Tran Quoc Toan, 2008).

I determined the time for the implementation of the problem-based learning process and the follow-up data collection so that the staff participants had enough time to attend the problem-based learning workshops, design the problem-based learning lesson plans, gather additional problem-based learning resources and implement a problem-based learning approach in their undergraduate classes. The problem-based learning implementation was intended to be completed in one semester in a range of university classes between December 2006 and July 2007. Therefore, the problem-based learning preparation workshops were held at the end of Semester 1 in December 2006, prior to the problem-based learning implementation. The implementation semesters were planned according to the Vietnamese school year
calendar from September to June. The other data from questionnaires and interviews I planned to collect from May to August 2007.

3.2.3 Research participants

3.2.3.1 Teacher participants

The eleven teacher participants in the study have been teaching in a range of undergraduate courses. Five lecturers from Ho Chi Minh City University of Education have been teaching in different areas, one in Vietnamese Literature, two in Psychology (Introductory/Development) and two in Introductory Education. The other six lecturers from Can Tho University have been teaching in Business and English, two in Business (Finance/Industry Administration) and four in English (General/Literature). All lecturers approached have been known to me through personal and professional networks in the two universities. Informal discussions regarding the project occurred first before any formal request to participate in this study was undertaken. The teaching staff all volunteered to participate in the study and attended PBL workshops prior to the study on how to implement a problem-based learning approach. The workshops were run by the investigator. Each staff member then agreed to implement the approach in teaching their university courses for the duration of the semester. I outlined the approaches used to conduct the problem-based learning workshops as well as the workshop content in the “research instrumentation” section of this study.
Following the implementation of problem-based learning in teaching their classes, eleven teacher participants who implemented a PBL approach in eleven different classes were all invited to complete a self-completion teacher questionnaire (see appendix 2) on their perceptions of the implementation of a problem-based learning approach. This was followed up by a telephone interview with the investigator to further articulate their perspectives on using a problem-based learning approach in their undergraduate classes. The specific details of the questionnaire and interview questions are presented in the “research instruments” section.

3.2.3.2 Student participants

The undergraduate students who had undertaken classes where a problem-based learning approach was implemented with the participant teaching staff were invited to participate in this research. At the beginning of each course lecture, I was permitted to go to the course lectures to inform students about the research project in detail and I invited them to participate in the study. Also, they all received a “Plain Language Statement” about the research in Vietnamese. Students who volunteered to be involved in the study were invited to sign a consent form. There were 182 from the 186 students from 11 classes who agreed to participate in the study. Each signed a consent form and completed a student questionnaire (see appendix 3). Four students were absent on the day of questionnaire collection.

In addition to the questionnaires being completed by the students, in each class, I numbered student participants who expressed in the questionnaire his/her interest in participating in the follow-up interview. I then randomly chose one of these students
from each class and invited him/her to take part in a telephone interview to further articulate his/her perceptions in learning through a PBL approach. There were 11 students selected to participate in the telephone interviews from the 11 problem-based learning classes.

In addition, student participation in this study had no relationship to any assessment task or other course requirements. If a student withdrew from the student questionnaire process, there would still remain an adequate student sample for analysis. However, if a student withdrew from a telephone interview, another student who had agreed on their questionnaire to be involved in the follow-up interview would be chosen by me as a substitute for the telephone interview with the investigator.

3.3. Ethical considerations for the study

Ethical issues were carefully considered for this study. Prior to data collection, an ethics application including the research design, questionnaires and interview questions was submitted to RMIT University’s ethics committee and an ethics approval was granted. Furthermore, the risk for this study was classified at level 2 as there was minimal risk to participants who agreed to be involved in the study voluntarily and were not individually identified. (Level 1 was no risk, and level 3 was for studies of high risk to individuals). The participants’ questionnaire results and interview data were only seen by the research investigator and the senior supervisor. Data collected was kept in a secure locked filing cabinet and digital data password protected. Hence, confidentiality of data was assured. In addition, all participants
were only referred to by pseudonyms or code names; anonymity of staff and students was thus assured.

3.4. Preliminary investigations

I trialled the preliminary investigations before I conducted the implementation process. I conducted the preliminary investigations with a small sample to gather a variety of necessary responses. I then analysed these responses so that where necessary the research instruments of questionnaires and focused interview questions could be revised. In addition, I anticipated that the introduction of the preliminary investigations would provide information to determine the likely success of data collection when I actually administered the research instruments.

I analysed the data collected from the preliminary investigations to evaluate the teacher questionnaire and interview questions as well as the student questionnaire and interview questions. The instruments would then be revised as necessary (Jaeger, 1997).

3.4.1. Sample of the preliminary investigations

Convenience sampling was used for the pilot study. Two teachers from Ho Chi Minh City University of Pedagogy were invited to complete the teacher questionnaire and answer the follow-up focus interview. The teachers who were invited for the preliminary investigations each had some years of previous experience in implementing a problem-based learning approach. In addition, two students who had
learnt through a problem-based learning approach in their prior classes were invited to trial the student questionnaire and focused interview questions.

### 3.4.2. Piloting the teacher questionnaire and focus interview

I gave the teachers who agreed to participate in the preliminary study the teacher questionnaire to complete and also made appointments for the trial of the follow up interviews. I encouraged the teachers to freely express their personal ideas in the questionnaire over how long it took to complete it, the layout of the questionnaire, the clarity of the questions asked and the instructions. I also encouraged the teachers to give further suggestions regarding any questions the teacher felt difficult to answer. I welcomed any additional questions regarding the implementation of a problem-based learning approach which the teachers wished to add or omit.

I conducted the teacher interview trials with the same teachers who agreed to answer the teacher questionnaire. The teachers came to see me at the appointed time for the focus interview. When attending the interview, the teachers also returned the completed questionnaires to me. I encouraged the teachers to freely answer the interview questions raised and comment on any questions which they saw as difficult to answer or unclear. I took notes on what the teachers said as accurately as possible and timed the interview to see if it was similar to the allotted time for the focus interview. At the end of the interview I summarised the teachers’ key points recorded as a check to see if the teachers were satisfied with the accuracy of the written information in representing their answers.
I then analysed feedback collected from the trial of the teacher questionnaire and focus interview. I aimed to revise the proposed teacher questionnaire and interview questions before they were actually administered to the teacher participants.

### 3.4.3. Piloting the student questionnaire and focus interview

Two students were introduced to me by their teachers who participated in the trialling of the proposed teacher questionnaire and I invited these two students for the preliminary investigation. I gave each student the proposed self-completion questionnaire to complete. I also invited the students to arrange for an appointment for the follow up interview to allow them to elaborate on their perceptions of learning through a problem-based learning approach. At the interview, I asked each student to express his/her personal views on how long it took to complete the questionnaire, to discuss the layout and the instructions of the questionnaire and the clarity of the questions asked. I also encouraged the students to comment on the clarity of questions in the pilot questionnaire.

On the interview day the completed student questionnaire was given back to me. Before the interview session I encouraged the students to freely respond to the questions asked and comment on any questions which they saw as being confusing. I also asked the students for permission to write down their answers. I, at the same time, timed the interview to see if it accurately represented the time expected for the focus interview. At the end of the interview the students were told the key points recorded by me as a check to see if it accurately represented what they said.
I analysed the feedback gathered from the trial of the student questionnaire and focus interview questions. This was used to revise the proposed student questionnaire and interview questions before they were actually administered to student participants.

3.4.4. Finding from the pilot study investigations.

Following the pilot study, one teacher who was invited to answer the proposed teacher questionnaire claimed that two questions asked in the questionnaire were unclear. I was then able to revise the wording of the questions. The teacher focus interview did not exceed the expected time of 30 minutes. None of questions in the proposed student questionnaire was thought to need revising. The time spent in conducting the student interview was the expected interview time of 30 minutes. One interview question regarding how students were grouped in PBL classes was said to repeat a similar question in the student questionnaire. This interview question was changed.

3.5. Research instrumentation

To gather a range of rich data for answering the research questions, a variety of data collection methods were designed and utilised prior to, and after the process of PBL implementation. The research instrumentation is detailed in the following sections.

3.5.1. Phase 1: Conducting PBL workshops with university teachers

To prepare for the success of the implementation of a problem-based learning approach as well as to gather a range of rich data of the teachers’ perceptions on
triailling the approach in their university classes, I conducted two problem-based learning workshops which lasted three hours each in the two selected universities with the teacher participants (see appendix 6 for the outline of the workshops). My aim for the problem-based learning workshops was to teach teachers as well as hold further discussions on the features of a problem-based learning approach and the strategies on how to implement the approach in the undergraduate setting. Also, the intention of the workshops was for me to be sure that the teacher participants had a clear understanding of a problem-based learning approach and how to implement the approach in their classes. Teachers’ comments of the usefulness of the workshops were detailed in chapter 4 of teacher perceptions in implementing a PBL approach.

Prior to the PBL workshops, I translated a range of resources related to PBL implementation into Vietnamese, the first language of teacher participants. I then sent these Vietnamese PBL resources to the teacher participants (see appendix 6). I contacted the teacher participants via emails and phone calls to invite them to attend one of the two PBL workshops as scheduled either in Can Tho University or in Ho Chi Minh City University of Pedagogy. I also advised the teachers the time and the venues where the PBL workshops were planned to be conducted.

The first workshop was conducted in December 2006 in Can Tho University with the six staff participants of the study. They teach the disciplines of English and Business. Prior to the PBL workshop, the participants had an opportunity to read some problem-based learning materials in Vietnamese. At the opening of the workshop, I thanked the teachers for their participation in both the problem-based learning workshop as
well as for agreeing to implement the problem-based learning approach in their classrooms.

The second workshop on problem-based learning training for five staff participants was held in Ho Chi Minh City University of Pedagogy in January 2007. At the training, I welcomed and appreciated teachers’ participation in the study and hoped that the study would be beneficial for future teaching. I also gave the teachers the plain language statement and consent form to be read and signed.

3.5.2. Phase 2: The process of the implementation of a PBL approach by the lecturers in university classes.

After attending the PBL workshops, I advised the teacher participants to do some preparation for implementing the process of problem-based learning. As the non-participant, I did not intervene in the process of lecturer implementation of a PBL approach in their university classes. The lecturers were advised to introduce the PBL approach and the styles of PBL assessment chosen to student participants at the first meeting of the class. This method of introduction is useful for students who are new to the PBL approach as it will help students’ readiness for learning through PBL which is likely to be a new and demanding learning approach for them.

The teachers were also advised to assign students to small learning groups or encourage them to set learning groups themselves. At the same time, the lecturers allocated learning problems to each group in the PBL classes. Importantly, the teachers were encouraged to facilitate students’ group work during the learning
process. The teachers were also advised to carefully select appropriate styles of assessment which can continuously evaluate students’ performance during PBL implementation. The styles of PBL assessment may be new and demanding in comparison with those used in lecture-based approach such as final tests. PBL students’ performance is assessed based on a broader range of criteria and is continuously conducted during the course.

The process of PBL implementation in a range of university classes in two universities in the South of Vietnam was implemented from January 2007 to June 2007. During the process of PBL implementation, I encouraged the teacher participants to freely contact me as a PBL implementation adviser to further discuss any queries about the problem-based learning approach. The student participants were also welcome to contact me via the email address presented in the Plain Language Statement about any issues related to learning through a problem-based learning approach.

3.5.3. Phase 3: Teacher questionnaires

According to Burns (2000), in educational research, the survey, a descriptive method, is often used to collect data. Data is often collected by means of a questionnaire, where a set of pre-determined questions are asked by the investigator. To conduct this study, a teacher questionnaire survey (see appendix 2) was constructed and administered to all 11 teacher participants who agreed to be involved in the study. The teacher questionnaires were first designed in English and then they were translated into Vietnamese by me. The survey was conducted in Vietnamese. The aim was to
help the lecturer participants from different disciplines to understand and complete the questionnaires.

Also, the teacher questionnaire was designed to provide the teachers with opportunities as well as encourage them to freely state their perspectives on the implementation of a PBL approach. The teacher questionnaire consisted of 19 questions (see appendix 2). It included both multi-choice questions which aimed to explore some information related to teachers’ individual teaching profession such as qualifications or years of teaching experience and open-ended questions which focused on how the teachers implemented a PBL approach in their university classes.

* Designing the teacher questionnaire

The teacher questionnaire was designed with four sections which aimed to collect a range of rich information to answer the research questions. The first section of the teacher questionnaire was designed to gather the staff’s professional background (questions 1-5) such as the name of the teachers’ university, the course taught and its duration, teachers’ years of teaching experience and the qualifications of the teacher participants. The second section of the teacher questionnaire was designed to collect data on the staff’s perspectives of the problem-based learning workshops (questions 6-9) such as the teacher participants’ prior knowledge of the problem-based learning approach and the usefulness of the problem-based learning materials provided before the workshops in helping the teachers understand about the approach. It also asked teacher participants if they gathered extra problem-based learning materials before the implementation of the approach.
The next section of the teacher questionnaire was designed to investigate the teachers’ perception of the process of the problem-based implementation (questions 10-15) such as the preparation of the problem-based learning class, facilitation during the process of problem-based implementation and the assessment styles used for the problem-based learning class. Also, this section was aimed at investigating the teachers’ perspectives on what was the most important part in the preparation of problem-based learning and the process of implementing a problem-based learning approach in class.

The last section of the teacher questionnaire (questions 16-19) was designed with four questions intended to investigate the teachers’ perspectives on the positive as well as negative aspects found during the process of problem-based learning implementation. This section was also intended to explore the teachers’ perception of the similarities and differences between a problem-based learning approach and other approaches they have used.

* Administering the teacher questionnaire

When the semester of PBL implementation in a range of Vietnamese university classes was about to finish, I distributed the teacher questionnaires to all 11 lecturer participants. I had two independent local colleagues who were not involved with the study distribute the teacher questionnaires to the lecturer participants and collect the completed questionnaires from them as well. One colleague was responsible for the distribution and collection of teacher questionnaires from the six lecturer participants of Can Tho University and the other colleague distributed and gathered teacher
questionnaires from the other five teacher participants of Ho Chi Minh City University of Pedagogy. When the teacher questionnaires were all collected, they were then sent to me in Australia for analysis.

3.5.4. Phase 4: Student questionnaires

To gather a range on rich data of students’ perceptions of learning through a PBL approach, a student questionnaire survey was also constructed and administered to all 182 student participants who had attended classes of PBL implementation and had agreed to be involved in the study. Also, the student questionnaires were first designed in English and then translated into Vietnamese by me. The aim of conducting the student questionnaire survey in Vietnamese was to help the students to understand and complete the questionnaires in their first language.

The student questionnaire was designed to encourage students to freely share their perceptions of learning through a PBL approach. The student questionnaire consisted of 16 questions (see appendix 3). It included both multi-choice and open-ended questions which focused on exploring how and what the learners learnt through a PBL approach.

* Designing the student questionnaire

The student questionnaire was designed for the purpose of collecting a range of rich data on students’ perspectives on learning through a PBL approach. It consisted of four sections which were aimed at gathering information for clarification of the research questions. The first section was designed to ascertain the students’ academic
level in their present course (question 1), the second section of the student questionnaire was designed to investigate the students’ perspectives of their learning through a PBL approach in previous classes and how they were prepared before the implementation of the approach (questions 2-3). The third section of the student questionnaire (questions 4-8) aimed to explore the students’ perceptions of how they were grouped in the problem-based learning, how they worked in their own group as well as how they negotiated with other groups to learn through a problem-based learning approach.

The last section of the student questionnaire (questions 9-15) focused on investigating the students’ perspectives of the assessment styles used in their problem-based learning class. This section was also aimed at students’ perception of the differences between the problem-based learning approach implemented and the traditional lecture-based approach they had learned through in previous classes.

The last question of the student questionnaire (question 16) I designed to provide an opportunity for the students who had completed the questionnaire and had an interest in participating in the follow up in-depth telephone interview with me. I invited them to state interest if they wished to participate in this way in further discussion of their learning experience through a problem-based learning approach.

* Administering the student questionnaire
When the semester of PBL implementation in a range of Vietnamese university classes was about to finish, I had the same two colleagues who helped me with data collection of the teacher questionnaires in the two universities distribute the student questionnaires to all 182 student participants. These colleagues also helped me with collecting of the completed questionnaires from the students.

The investigator kept contact with the two independent colleagues via email and telephone during the process of questionnaire collection to see if any problems arose. When the student questionnaires were all gathered, they were then carefully packed and sent to the investigator in Australia for analysis.

3.5.5. Phase 5: Follow up teacher interviews

Eleven teacher participants were given the opportunity to select the appropriate time for participating in the telephone interview. I conducted eleven 30-minute interviews with eleven teachers in Vietnam via telephone from Australia. When the telephone interviews were taking place, I took notes. The telephone speaker was also turned on in order to record the interviews. This was to guarantee accuracy when transcribing the interviewee responses (Yin, 2003).

In the focused interviews, there was an interview guide for the investigator (see appendix 4) which builds up a series of topics rather than fixing the wording or ordering questions. The interview guide was based on the matters central to the research questions. The ways of asking questions and the conversation between the interviewer and the interviewee were more flexible than in the survey interview.
approach (Minichiello, Aroni, Timewell, & Alexander, 1995). In this study, 11 teachers participated in the in-depth telephone interviews. The interviews were conducted in the medium of Vietnamese, the first language of all teachers.

The semi-structured teacher-focused interview questions were designed to provide teacher participants with opportunities to further elaborate on their experiences gained while teaching using a problem-based learning approach. There were 12 interview questions (see appendix 4). The questions were designed as the semi-directive form of questioning to help teachers freely explain their perceptions of implementing a problem-based learning approach. The style of questioning was aimed at further investigating some issues asked in the teacher questionnaire and to allow teachers to elaborate on their perspectives of using a problem-based learning approach. The questions were also used to confirm the ideas presented in the questionnaire.

The first question of the teacher interview questions asked the participants if they had implemented a problem-based learning approach in their university classes prior to the study. This aimed to explore if there were any differences of problem-based learning perceptions amongst the teachers who had greater experience in using the approach. I designed the next three questions to further investigate the teachers’ perceptions of the problem-based learning workshops as well as their preparation for the problem-based learning classes.

The teachers’ perception of problem-based learning facilitation was further explored from the next four interview questions (questions 5-8). Questions were asked on the role of a problem-based learning facilitator, the teachers’ ways of allocating student
groups or supervising students’ group work as well as styles of assessments used. Interview questions 9 and 10 were aimed at investigating teachers’ perspectives of any positive or negative aspects in the process of implementing a problem-based approach.

The last two questions in the teacher interview were designed to encourage teachers to further discuss their teaching experience of a problem-based learning approach compared with teaching through other methods. I also asked the teacher participants if they found the problem-based learning a worthwhile approach to use with students.

3.5.6. Phase 6: Follow up student interviews

The investigator contacted the student interviewees via emails and phone calls to arrange for the telephone interview. Eleven student interviewees were given the opportunity to select their appropriate time for the telephone interviews which were conducted in the medium of Vietnamese, the first language of all participants. The investigator asked for permission to take notes and record while the student interview participants were answering the questions. The telephone speaker was turned on so that the interviews were recorded. This was to guarantee the accuracy of the interviewee responses (Yin, 2003).

The focused student interviews were designed with 11 questions aimed at promoting student participants to further discuss their perspectives in learning through a problem-based learning approach (see appendix 5). Student interview questions were designed with the semi-directive form of questioning to help students freely discuss
their learning through the PBL approach. Specifically, the style of non-directive questioning was aimed at further investigating some issues previously asked in the student questionnaire. This was intended to confirm what was collected in the questionnaire as well as to elaborate students’ learning perspectives.

The first question of student interview questions was designed to learn if student participants have had any previous experience of a problem-based learning approach in their classes. The next two questions (2-3) were aimed at understanding students’ perception of preparation before attending the problem-based learning class as well as any positive aspects of the approach that they found to be useful for the learning.

The students’ perception of group work and teachers’ facilitation was further investigated from the interview questions 4-9 such as issues on solving learning difficulties, gathering additional resources and using assessment styles. The last two questions explore student perceptions of a problem-based learning approach compared with other methods of learning. Student interviewees were also asked to discuss any perceived benefits of the approach.

3.6. Analysis of data

With a range of data collected from the teacher and student participants, I attempted to represent the teachers’ perspectives through the implementation of a PBL approach in a range of university classes. I also represented students’ perceptions in learning through this approach. I organised data from teacher questionnaires, student
questionnaires, teacher telephone interviews and student telephone interviews for analysis.

Glaser and Strauss (1967) introduce the discovery concept of grounded theory which describes the constant comparative method of qualitative analysis. This method is recommended to analyse qualitative data by coding the data to get some experimental means to test hypotheses. Moreover, Glaser and Strauss (1967) also advocate combining coding with analysis to help locate and build grounded theory. In the constant comparative method of qualitative analysis, the data is coded only enough to create categories and hypotheses. In the process of data analysis in this study, this constant comparative method of qualitative analysis is used to code and categorise data collected.

The Vietnamese teachers’ responses were then translated into English for checking. Based on the English version, I organised the teacher questionnaire information into categories which I determined by a text search of key issues described teachers’ perceptions in implementing a PBL approach. I created categories until I noted all responses. In this way, I noted and highlighted each lecturer’s questionnaire response. I highlighted similar responses on specific issues in the same colour and I then combined them. Moreover, I also noted and coded a variety of responses which I saw to be without “similar responses”. To limit researcher bias, I selected samples of teacher questionnaires to be independently categorised by both me and an independent colleague who was research student like me. I also helped him with his research categorisation. I had the colleague carry out the work of categorisation with the sample of lecturer questionnaires. Specifically, the colleague was advised to
follow the process of noting and coding the lecturer responses. The two sets of coding were then compared and any issues of differences included contradictions, surprises or anomalies were discussed and rectified.

With teacher telephone interviews, to guarantee the accuracy of the teacher interview responses, I listened to the teacher interview recordings again while reading the Vietnamese notes taken in prior interviews as check to ensure that all teachers’ key responses were noted. All Vietnamese transcriptions of teacher responses were translated into English for checking. Then, teacher interview information was noted and coded. The processes of coding and categorising of teacher interview responses were similar to those used with teacher questionnaire information, especially in the selection of like responses. The same independent colleague who agreed to be involved in the categorisation of teacher questionnaire data was also invited to participate in the independent coding and categorising of samples of teacher interview responses.

I combined like responses from the lecturer questionnaire and lecturer interviews. I also presented like responses and categories of these responses in the form of tables. Further, I compared teachers’ responses to see if there is any difference between teacher participants in implementing a PBL approach.

With the analysis of student data, the student questionnaire information was presented based on the individual questionnaire questions in Vietnamese. As there were 182 student questionnaires returned out of 186 students from 11 PBL classes/cases, I first summarised student questionnaire data in 11 summaries, one for each class, and I then
combined them to be a complete record of student data. I translated the data into English for checking. Based on the English version, I organised the student questionnaire information into categories which I determined by a text search of key issues described students’ experience of learning through PBL. I created categories until I noted all responses. In this way, I noted and highlighted student questionnaire responses. Like responses were highlighted in the same colour and they were then combined by me. In addition, I also noted and coded a variety of student questionnaire responses which I saw to be without “like responses”. To limit my bias in analysis of student questionnaire data, I selected samples of student questionnaires to be independently categorised by both me and the colleague who also participated in the categorisation with samples of lecturer questionnaires and interviews. This aimed at ensuring that the highlighted key words and categories were likely similar sets of learner responses. We then compared the two sets of coding and discussed any issues of differences such as contradictions, surprises or anomalies.

To guarantee the accuracy of the interview responses, I listened to student interview recordings while reading the notes taken in prior interviews as ‘a check’ to ensure that all students’ key responses were noted. All Vietnamese transcriptions of student responses were translated into English for checking. Key issues of student interview information described students’ experience in learning through a PBL approach was then noted and coded. The processes of coding and categorising of student interview responses were similar to those used with student questionnaire information, especially in the selection of like responses. I invited the same independent colleague who participated in the categorisation of student questionnaire data to conduct the independent coding and categorising of samples of student interview responses.
In addition to the analysis of student data, the research questions aimed at investigating students’ perspectives in learning through a PBL approach became the subheadings. The responses from student questionnaires and student interviews were coded. Like responses and categories of these responses were presented in the form of tables. Comparisons were made between student responses based on their experience at studying using a PBL approach.

I presented the results of the study in the following chapter 4 under the heading “Overview” which represents the teachers’ perceptions of implementing a problem-based learning approach and the students’ perceptions of learning through a problem-based learning approach.
CHAPTER 4
OVERVIEW

An overview of the teachers’ and students’ perceptions on their experiences of problem-based learning (PBL) will be presented in this chapter. A more detailed analysis and discussion of the results will be presented in chapter 5 where the rich descriptions will be examined. Teachers’ perceptions will now be presented followed by students’ perspectives.

4.1. Teachers’ perceptions of implementing a problem-based learning approach

The teacher questionnaire was administered to 11 lecturers from two universities in the south of Vietnam. The aim was to provide an understanding of the teachers’ perceptions of their implementation of a problem-based learning approach.

The results from the teacher questionnaire are presented in the form of tables to provide an overview of the findings. The teachers and their classes are coded to allow themes and individual teacher perspectives to be recognised. The teachers from Can Tho University and their classes are represented as T1 to T6 (teachers 1-6) and C1 to C6 (classes 1-6) respectively. Examples T7 to T11 (teachers 7-11) and C7 to C11 (classes 7-11) represent the perspectives of teachers from Ho Chi Minh City University of Pedagogy and their PBL classes.

The data from the teacher questionnaire is presented under the following headings:
4.1.1. Teachers in the study.

4.1.2. The PBL workshops.

4.1.3. The implementation of a PBL approach in undergraduate classes

4.1.1. Teachers in the study.

This section of the study presents the teacher responses regarding the number of years they have been teaching and their level of qualifications.

4.1.1.1. The sample of teachers in the research.

Eleven teachers from two universities in the South of Vietnam had the following range of teaching experience.

<table>
<thead>
<tr>
<th>Years of teaching</th>
<th>Teachers (n= 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 years</td>
<td>01 (T1)</td>
</tr>
<tr>
<td>From 5 to 10 years</td>
<td>01 (T10)</td>
</tr>
<tr>
<td>From 11 to 20 years</td>
<td>06 (T2,5,6,8,9,11)</td>
</tr>
<tr>
<td>More than 20 years</td>
<td>03 (T3,4,7)</td>
</tr>
</tbody>
</table>

Table 1. Teaching experience of teachers

Over 80% of 11 teacher participants had more than ten years of teaching experience.
4.1.1.2. Qualification levels of teachers.

The eleven teacher participants had a range of qualifications.

**Table 2. Levels of qualification which the teachers have achieved**

<table>
<thead>
<tr>
<th>Qualification levels</th>
<th>Teachers (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor degrees</td>
<td>01 (T1)</td>
</tr>
<tr>
<td>Masters degrees</td>
<td>06 (T2,4,5,6,10,11)</td>
</tr>
<tr>
<td>PhD. degrees</td>
<td>04 (T3,7,8,9)</td>
</tr>
</tbody>
</table>

In Vietnam, the teacher participants who are responsible for educating students to become university graduates are usually required to have an academic level of at least a bachelor degree. Ten of the eleven teacher participants had qualification levels of Masters or higher.

4.1.1.3. Teachers’ prior experience in implementing PBL.

Amongst 11 teacher participants, there were five teachers who had applied PBL in their teaching prior to the study and six teachers who implemented the approach first through their participation in the study.

**Table 3. Teachers who had implemented PBL prior to the study.**

<table>
<thead>
<tr>
<th>Teachers</th>
<th>Responses (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having implemented PBL prior to the study</td>
<td>05</td>
</tr>
<tr>
<td></td>
<td>(T2,3,4,7,8)</td>
</tr>
<tr>
<td>First implemented PBL through participating in the study</td>
<td>06</td>
</tr>
<tr>
<td></td>
<td>(T1,5,6,9,10,11)</td>
</tr>
</tbody>
</table>
Five teacher participants commented that they had implemented PBL in their teaching prior to this study. Three of them (T2, 3 & 4) described having had the opportunity to learn through a PBL approach themselves and they implemented the approach in their classes after their graduation. Two teachers (T7&8) had attended the workshop entitled “Intel-teach to the future” sponsored by Intel Vietnam on teaching and learning through project-based learning prior to participating in the study. After the Intel workshop, these two teachers had organised their undergraduate classes using project-based learning.

A range of understandings was held by teachers about teaching through a PBL approach prior to attending the PBL workshops with the investigator. These are represented in table 4.

<table>
<thead>
<tr>
<th>Features identified by teachers</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBL is a student-centred approach</td>
<td>05</td>
</tr>
<tr>
<td>It is an innovative approach to enhance the learners’ thinking, self-study, creativity and group work</td>
<td>05</td>
</tr>
<tr>
<td>PBL is one of the models of inquiry-based learning or learning by discovering</td>
<td>03</td>
</tr>
<tr>
<td>PBL is a new teaching and learning approach introduced in Vietnamese universities in recent years</td>
<td>02</td>
</tr>
</tbody>
</table>

Table 4. Teachers’ identification of the features of a PBL approach prior to participation in the study.
The subject content could be delivered through PBL in different ways.

| PBL is a new approach used in western universities | 01 |
| PBL is a way of asking questions | 01 |

Some teachers contributed several responses. Five teacher participants knew PBL as a student-centred approach whilst there were three teacher responses which described PBL as one of models of inquiry-based learning or learning by discovering. Five teacher responses claimed using PBL enhances the learners’ thinking, self-study, creativity and group work. Two teachers stated that PBL had been introduced in some Vietnamese universities in recent years.

4.1.2. The PBL workshops.

One of the planned research phases was the conducting of PBL workshops by the investigator with the teacher participants. In addition, prior to conducting the PBL workshops, I sent a variety of PBL resources to the teachers for their self-study in advance.

4.1.2.1. The usefulness of PBL resources.

Teachers described the useful aspects of PBL materials.
Table 5. Teachers’ perceptions on the PBL resources provided prior to conducting the workshops.

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having a better understanding of PBL approach</td>
<td>07</td>
</tr>
<tr>
<td>Helping in designing learning problems which promote students’ creativity, thinking, learning independence and teamwork skills.</td>
<td>06</td>
</tr>
<tr>
<td>Knowing how to set good tasks for students</td>
<td>03</td>
</tr>
<tr>
<td>Changing the ways of teaching to be good teacher</td>
<td>01</td>
</tr>
<tr>
<td>They are good supporting readings for the PBL implementation</td>
<td>01</td>
</tr>
</tbody>
</table>

4.1.2.2. Conducting the PBL workshops.

The first PBL workshop was conducted in December 2006 in Can Tho University with six teacher participants who have been teaching a range of disciplines such as English and Business.

At the workshop, the teacher participants raised a number of issues related to using a PBL approach in teaching. One of the issues was the implementation of the PBL approach in large classes because of the need of large number of lecturer availability for many tutorials. Also, the staff participants were confused if they could seek assistance from their colleague tutors for additional tutorials. Another issue is that the so-called continuing/process assessment which is often utilised in PBL
implementation. This style of process-oriented assessment may cause inconveniences because the final-only examination has been used as the popular assessment in most courses for years. Furthermore, the requirement of writing learning problems which attract students’ interests was another concern of the teachers. The teachers also raised the issue of how to encourage students to actively engage in class discussions.

Fortunately, there were two lecturers (T2&T3) who had learned through a PBL approach in their postgraduate courses in foreign institutions in the Netherlands and Australia. They had been implementing a PBL approach in teaching their university classes in recent years and they shared their teaching experience using PBL with the other teacher participants. Importantly, being strong advocates for the PBL implementation and having taught using the approach for several years, these two teachers had introduced some PBL experiences which helped to bring a variety of teaching solutions for the above-mentioned issues raised by the teacher participants. For example, to solve the tutorial issue, these two lecturers had invited their departmental colleagues to cooperate in the teaching as tutors.

About the assessment styles used in the PBL implementation, some new styles of assessments such as peer assessment, self-assessment, individual participation, and assessment of group work product were introduced to the teacher participants. The teachers also discussed the advantages as well as the weaknesses of the styles of assessment. In general, the teachers had been advised to spend more time on student assessment in teaching through a PBL implementation in comparison with teaching through other traditional methods. The teacher participants were also concerned about
the administration of many styles of assessment during the process of PBL implementation.

At the closing of the workshop, the teacher participants commented that they had gained a thorough understanding of PBL theory from the study of PBL resources provided prior to the workshop. They had also learned from the teaching experiences of implementing a PBL approach shared by other teachers. In addition, some teachers expressed more confidence and eagerness to implement a PBL approach in their classes.

The second PBL workshop was conducted with five teacher participants from Ho Chi Minh City University of Pedagogy in January 2007. The teachers have been teaching a range of disciplines such as Introductory Education, Psychology and Vietnamese Literature.

Although PBL was seen to be a new teaching approach for most of teachers attending the Ho Chi Minh City workshop, they all had an opportunity to participate in the training program entitled “Intel- teach to the future” sponsored by Intel Vietnam. These teachers said that they had been introduced to a project-based learning approach at the Intel training, and they found similarities between these two approaches. Further, they had been implementing project-based learning in their classes for the past two years.

In addition, when studying the PBL resources provided prior to the workshop and comparing with the project-based learning learned from the Intel training, the teachers
mentioned some similarities and differences between the two innovative teaching approaches. For example, they all agreed that these two approaches were good for students’ skill development such as in improving students’ skills of problem-solving, self-directed learning, team-work and thinking. The teachers also commented that their prior roles as knowledge providers in the conventional class had been changed to be facilitators. Their facilitative roles are to provide their students with help and guidance in the process of gathering additional learning resources to solve the given learning problems.

Furthermore, the teacher participants at Ho Chi Minh City PBL workshop had coincidently pointed out some teaching and learning issues which were similar to those raised by the participants at Can Tho PBL workshop, such as the implementation of a PBL approach in large classes, or the assessment styles to be effectively used in PBL implementation. They also claimed that PBL implementation had been very time-consuming in comparison with teaching a similar course using other traditional approaches. Fortunately, two teacher participants (T7&T8) who had attained their PhDs by conducting studies on didactic theories had shared their experience on trialling some innovative approaches in teaching large university classes with other teacher participants. Also, the investigator reported some experience gained from the Can Tho PBL workshop. This was seen as an additional preparation for the teachers prior to the PBL implementation.

It can be said that the two PBL workshops brought better understandings of the PBL approach for the teacher participants, especially in the implementation of the approach in the university setting. In addition, some teachers commented that they had
broadened their knowledge of innovative teaching approaches. They also said that they had learnt a range of assessment styles that could be used in the implementation of PBL. Staff experienced in using innovative approaches like PBL said that the knowledge they attained from the PBL workshop provided additional clarification of the approach. This was a really useful benefit from their participation in the study.

The following table 6 represents the teachers’ comments on the usefulness of the PBL workshops.

Table 6. Teachers’ perceptions on the usefulness of the PBL workshops.

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having a better understanding of PBL: advantages and disadvantages</td>
<td>07</td>
</tr>
<tr>
<td>Learning better ways of class management in PBL</td>
<td>04</td>
</tr>
<tr>
<td>Feeling more confident to implement PBL</td>
<td>03</td>
</tr>
<tr>
<td>Learning ways of getting student feedback in PBL</td>
<td>03</td>
</tr>
<tr>
<td>Learning how to work as facilitator in PBL class</td>
<td>03</td>
</tr>
</tbody>
</table>

The results of the study showed that the teachers were provided with a better understanding of PBL.

4.1.3. The implementation of problem-based learning.

4.1.3.1 The duration of courses implementing a PBL approach.
The eleven teachers implemented a PBL approach over different time frames. Also, the PBL model adopted varied as to whether the PBL was used in the whole course or part of the course.

**Table 7. Number of periods spent implementing a PBL approach and the PBL models used.**

<table>
<thead>
<tr>
<th>Teachers (n=11)</th>
<th>Disciplines and number of periods</th>
<th>PBL models used</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>General English-45P</td>
<td>PBL used in part of the course</td>
</tr>
<tr>
<td>T2</td>
<td>English Literature-90P</td>
<td>Using PBL in a whole course</td>
</tr>
</tbody>
</table>
| T3             | Business-45P
Finance Administration       | Using PBL in a whole course |
| T4             | Business-90P Industry Administration | PBL used in a whole course with mini lectures delivered amongst PBL sessions |
| T5             | English Literature-90P           | PBL used in a whole course with mini lectures delivered amongst PBL sessions |
| T6             | English Literature-90P           | PBL used in a whole course with mini lectures delivered amongst PBL sessions |
| T7             | Introductory Education-60P       | PBL used in a whole course with mini lectures delivered amongst PBL sessions |
| T8             | Introductory Education-60P       | PBL used in a whole course with mini lectures delivered amongst PBL sessions |
| T9             | Development Psychology - 60P     | PBL used in a whole course with mini lectures delivered amongst PBL sessions |
The number of periods within courses spent implementing a PBL approach varied as well as the models used. Four teachers implemented a PBL approach in teaching their courses for 90 periods. Three teachers used PBL in their university courses for 45 periods and three teachers for 60 periods. Only one course implemented a PBL approach for 30 periods.

With respect to the PBL models used in these courses, seven teachers described their teaching as PBL throughout the whole course with mini lectures designed and delivered within the PBL sessions. These lectures were used to support for students’ work on the PBL problems. Two teachers used PBL in their whole courses without supporting mini lectures. Two teachers used PBL in part of the course and the other part was taught using a lecture-based approach when it was seen to be difficult to implement a problem-based learning approach.

4.1.3.2. Student year level where a PBL approach had been used.

Table 8. Student academic year level where a PBL had been implemented.

<table>
<thead>
<tr>
<th>Teachers (n=11)</th>
<th>Student academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>04 (T1,8,10,11)</td>
<td>First year</td>
</tr>
</tbody>
</table>
First year students are typically 18 years of age and come to university straight from high school.

4.1.3.3. Range of disciplines implementing a PBL approach.

Table 9. The discipline fields implementing a PBL approach.

<table>
<thead>
<tr>
<th>Teachers (n=11)</th>
<th>Disciplinary fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>04 (T3,6,7,8)</td>
<td>Social Science</td>
</tr>
<tr>
<td>07 (T1,2,4,5,9,10,11)</td>
<td>Humanity Science</td>
</tr>
</tbody>
</table>

A range of disciplines used a PBL approach. Seven teachers taught Humanity Sciences such as Psychology, English and Vietnamese Literature using PBL in their undergraduate classes. The other four teachers taught in the disciplines of Social Sciences such as Introductory Education and Business.

4.1.3.4. Teachers’ perceptions on the preparation prior to the PBL implementation

The teachers were asked to comment on what learning resources they had gathered in preparation for their PBL implementation, and what other preparation they made prior
to the implementation. These two issues will be represented in the following tables 10 & 11.

4.1.3.4.1. Teachers’ perceptions on the collection of additional PBL resources prior to the PBL implementation.

The results showed that most teachers had collected additional learning resources from conference proceedings, and online articles. Also, the teachers engaged in discussions with their colleagues for furthering their knowledge of PBL implementation. Table 10 details the teacher responses in collecting additional PBL materials.

Table 10. Additional PBL preparation and resources gathered by teachers prior to the PBL implementation.

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gathering additional PBL resources from conference proceedings, online articles</td>
<td>06</td>
</tr>
<tr>
<td>Discussing PBL implementation with colleagues</td>
<td>06</td>
</tr>
<tr>
<td>Participating in online forums on PBL</td>
<td>02</td>
</tr>
<tr>
<td>Attending other teaching and learning workshops</td>
<td>02</td>
</tr>
</tbody>
</table>

4.1.3.4.2. Teachers’ perceptions on the necessary preparation prior to the first PBL class.
The teachers were asked what preparation they saw as necessary prior to the first PBL class. Their perceptions are represented in the table 11.

**Table 11. Teacher perceptions on the necessary preparations prior to the first PBL class.**

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designing learning problems</td>
<td>11</td>
</tr>
<tr>
<td>Gathering supporting readings related to the subject content</td>
<td>08</td>
</tr>
<tr>
<td>Preparing learning facilities like classroom, data projector, stationery, posters and pictures</td>
<td>06</td>
</tr>
<tr>
<td>Designing scaffolding questions</td>
<td>05</td>
</tr>
<tr>
<td>Tested students’ prior knowledge</td>
<td>04</td>
</tr>
</tbody>
</table>

Most teachers found it necessary to design learning problems as well as gather additional resources related to the subject content to be taught in the preparation for first PBL classes.

**4.1.3.5. Teachers’ perceptions on the process of implementing PBL in a range of university classes.**

The study explored the teachers’ ways of introducing PBL to students.
4.1.3.5.1. The teachers’ perceptions on the introduction of PBL approach to students.

The introduction of PBL approach to students in the first class meeting is seen to be essential for the PBL implementation as it helps students prepare for working with a new teaching and learning approach which could be more demanding and different from traditional approaches they have been familiar with. Teachers’ perceptions on how they introduced PBL approach to their students in the first class were represented in table 12.

Table 12. Teacher perceptions on the introduction of PBL approach to students.

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explaining the requirements of the program, teaching and learning approaches teacher and students are going to work with, providing students with learning materials and discussing the assessments used.</td>
<td>10</td>
</tr>
<tr>
<td>Explaining to students the differences between the PBL approach and other traditional approaches they had learnt through. Hence, students understand their new role in PBL class.</td>
<td>09</td>
</tr>
<tr>
<td>Guiding students with some skills needed to complete the assignments, encouraging students to work collaboratively and engage actively in the task given.</td>
<td>07</td>
</tr>
<tr>
<td>Explaining the usefulness of learning through PBL to</td>
<td>04</td>
</tr>
</tbody>
</table>
Ten teachers wrote that they had explained the requirements of the course to students, and introduced the teaching and learning approach the teacher and students were to work with. These teachers also provided the learners with learning materials and discussed the assessment styles to be used in the course. Moreover, there were nine teacher responses described that they introduced PBL approach to students by pointing out some differences between the approach and other traditional methods they had learnt through in prior classes. The teachers expected that this introduction would provide students with an understanding of their new role in PBL class.

In addition, seven teachers commented that they had introduced students to some learning skills which were seen to be necessary for the completion of the assignments. The teachers also advised students to actively participate in the process of solving the learning problems. There were four teacher responses which described they introduced the advantages of learning through PBL to students in the first class meeting. Further, an individual teacher mentioned the need of reviewing of prior knowledge which would be seen as foundations for learning the new course content.

The study aimed to investigating the teachers’ organisation of group work, their facilitation during the process of PBL implementation, and their assessments styles used in PBL. Teachers’ perceptions on these issues were represented in the following tables 13, 14 &15.
4.1.3.5.2. Teachers’ perceptions on the organisation of student group work in PBL implementation.

4.1.3.5.2.1. The allocation of student group.

One of the important features of the implementation of a PBL approach is the organisation of student learning in the group work. All teachers had group work in their PBL classes.

Table 13. The allocation of student group

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students were assigned in groups by teachers</td>
<td>07 (T1,4,5,6,9,10&amp;11)</td>
</tr>
<tr>
<td>Students were encouraged to form groups themselves</td>
<td>04 (T2,3,7&amp;8)</td>
</tr>
</tbody>
</table>

Most teachers in the study assigned students to groups while others encouraged students to form their own groups. The true spirit of PBL is to train students to work in team as would be the case in their future workplaces where they would have on choice over who works with them. Learning to work with whoever comes their way is part of the PBL spirit and so the teachers should have randomly distributed the groups.

4.1.3.5.2.2. The organisation of student group.
The size of groups varied considerably.

Table 14. The organisation of student group

<table>
<thead>
<tr>
<th>Teacher responses on group sizes</th>
<th>Number of responses (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups of 3 to 5 students</td>
<td>07 (T2,3,4,5,6,7&amp;8)</td>
</tr>
<tr>
<td>Groups of 6 to 7 students</td>
<td>03 (T1,9,10)</td>
</tr>
<tr>
<td>Groups of 10 students</td>
<td>01 (T11)</td>
</tr>
</tbody>
</table>

Teacher responses on group roles

| Students were encouraged to set group norms and other group issues such as choosing group name, group leader on their own. | 07 (T2,3,4,5,6,7&8) |
| Teachers appointed group leaders and introduced group norms to students to be discussed. | 04 (T1,9,10,11) |

4.1.3.5.3. Teachers’ perceptions on the process of PBL facilitation.

The PBL facilitation is seen as one of the important stages in the process of PBL implementation. In analysing the teachers’ perceptions on the process of PBL facilitation, the results are represented in two sections: the in-class facilitation and the out-of-class facilitation.

4.1.3.5.3.1. Teachers’ in-class facilitation during the PBL implementation.
Teachers facilitated learning in a range of ways.

**Table 15. Teachers’ in-class facilitation.**

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introducing learning problems to class/ groups and encouraging groups to assign</td>
<td>11</td>
</tr>
<tr>
<td>work to individual group members as well as schedule group meetings.</td>
<td></td>
</tr>
<tr>
<td>Providing additional resources for student learning</td>
<td>11</td>
</tr>
<tr>
<td>Walking around student groups, observing while they were working, and providing</td>
<td>11</td>
</tr>
<tr>
<td>help if needed, no direct involvement in student learning.</td>
<td></td>
</tr>
<tr>
<td>Advising students to use power-point presentations to present their final group</td>
<td>10</td>
</tr>
<tr>
<td>work.</td>
<td></td>
</tr>
<tr>
<td>Requiring students to submit group reports which described the progress of the</td>
<td>09</td>
</tr>
<tr>
<td>group, and any difficulties arisen every group meeting.</td>
<td></td>
</tr>
<tr>
<td>Allocating necessary time for every learning problem which was expected to be</td>
<td>09</td>
</tr>
<tr>
<td>finished.</td>
<td></td>
</tr>
<tr>
<td>Providing students with the assessment forms such as group assessment, self-</td>
<td>09</td>
</tr>
<tr>
<td>assessment.</td>
<td></td>
</tr>
</tbody>
</table>

In the process of facilitation within PBL class, all teachers stated that they had begun the PBL session by introducing the learning problem to class. They then led student discussions to help students divide the problem into small learning issues which were
assigned in groups. Next, the teachers encouraged each group to assign work to individual group members and schedule for the group meetings. Also, all the teachers provided additional learning resources for students’ group work.

Teachers allocated the expected time for every learning problem to be finished to help students time whilst they were solving the assigned problem. Several teachers required students to submit group progress reports every group meeting. Any difficulties found during the group work were also encouraged to be put in the group report.

During the process of students’ group work, all teachers facilitated students’ in-class group work by walking around student groups, observing students while they were discussing the learning issues. The teachers also provided help for groups if needed. The teachers further claimed that they only provided students with guidance to help them clarify the learning problem. They did not get directly involved in students’ group work. About the presentation of the groups’ tentative solutions, nine teachers advised their students to use the power-point software to present their final group work.

4.1.3.5.3.2. Teachers’ out-of-class facilitation during the PBL implementation.

In the process of PBL facilitation, the teacher participants not only provided supervision for students within PBL sessions, but they also facilitated students’ learning out of class as well. Teachers’ perceptions on the facilitation out of PBL sessions are represented in the table 16.
Table 16. Teachers’ facilitation out of class.

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing students with consultations via email, telephone</td>
<td>11</td>
</tr>
<tr>
<td>Providing students with consultation in person</td>
<td>02</td>
</tr>
</tbody>
</table>

All teachers facilitated students’ learning out of PBL class via email and telephone. Also, two teachers additionally provided students with facilitation in person.

Table 17. Issues requiring facilitation out of class.

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helping students clarify some learning difficulties arisen during the process of the group work.</td>
<td>11</td>
</tr>
<tr>
<td>Providing consultations for students about their presentations before they were presented to the class.</td>
<td>11</td>
</tr>
<tr>
<td>Helping students solve the conflicts between group members during the learning process.</td>
<td>02</td>
</tr>
</tbody>
</table>

All teachers provided students with further clarifications for some learning difficulties that the students faced in their learning process. They provided consultation for student groups about the group presentations before they were presented to the whole class, as well as helped solve difficulties.
4.1.3.5.4. The assessment styles used in the PBL implementation.

The assessment styles used during the process of PBL facilitation are represented in two sections: the teachers’ perceptions on the composition of assessment and the implementation of assessment.

4.1.3.5.4.1. Composition of student assessment in PBL implementation.

All teacher participants had divided the assessment into two stages: in-progress assessment and final assessment.

Table 18. Teachers’ perceptions on the composition of student assessment.

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-process assessment (30%), final assessment (70%)</td>
<td>09 (T1,2,3,4,5,6,7,8,9)</td>
</tr>
<tr>
<td>In-process assessment (40%), final assessment (60%)</td>
<td>02 (T10, 11)</td>
</tr>
</tbody>
</table>

Most teachers divided the assessment used in their PBL class into two parts, in-process assessment and the final assessment. All teachers had the heavier weighting in the final assessment.

4.1.3.5.4.2. The implementation of the assessment.

4.1.3.5.4.2.1. In-process assessment styles.
The following table presents the assessment styles the teachers used in their PBL classes to assess their students’ performance.

**Table 19. In-process assessment styles.**

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-process assessment based on self-assessment, group assessment, class attendance, regularly submitted group reports and the result of group presentation.</td>
<td>02 (T2,3)</td>
</tr>
<tr>
<td>In-process assessment based on self-assessment, group assessment and the result of group presentation.</td>
<td>07 (T1,4,5,6,7,8,9)</td>
</tr>
<tr>
<td>In-process assessment based on the result of group presentation only.</td>
<td>02 (T10,11)</td>
</tr>
</tbody>
</table>

Two teachers used a wide range of criteria in process assessment and seven teachers used three criteria. Only two teachers based their in process assessment on one approach.

**4.1.3.5.4.2.2. Final assessment styles.**
Most of teacher participants implemented assessment at the end of the course by administering a written examination which accounted for 60 percent to 70 percent of the total course. The written assessments were in the form of test, multiple choices and oral test. Only one teacher finally assessed students based on the results of the group presentation and feedback of the groups (see table 20 below).

**Table 20. Final assessment styles.**

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written final test</td>
<td>08 (T1,2,3,5,6,8,9,10)</td>
</tr>
<tr>
<td>Basing on the final results of the group presentations and feedback from the groups</td>
<td>01 (T7)</td>
</tr>
<tr>
<td>Multiple-choice final test</td>
<td>01 (T11)</td>
</tr>
<tr>
<td>Oral final test</td>
<td>01 (T4)</td>
</tr>
</tbody>
</table>

4.1.3.6 Teacher perceptions related to the process of PBL implementation.

In the investigations of the teachers’ perceptions related to the process of PBL implementation, the investigator also explored teachers’ perceptions of the important parts in the process of PBL preparation, also facilitation, the negative/positive aspects in the process of PBL implementation, and the biggest difference found during the implementation between PBL and other traditional methods.
4.1.3.6.1. Teachers’ perceptions on the most important part in the process of PBL preparations.

In analysis of teachers’ perceptions on the important part in the process of PBL preparation, the teacher participants commented that the issues which were seen to be the most important in their PBL preparations.

Table 21. Teacher perception on the most important part in the process of PBL preparation.

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designing learning problems incorporating the learning outcomes and student interests.</td>
<td>08 (T2,3,4,5,6,7,8,9)</td>
</tr>
<tr>
<td>Having vast learning materials to provide for students’ self-study and a thorough understanding of the subject content.</td>
<td>03 (T1, 10,11)</td>
</tr>
</tbody>
</table>

Most teachers assumed that the designing of PBL problems was the most important part in PBL preparations. Other teachers considered it was the having an array of learning resources to support students’ self-directed learning and a thorough comprehension of the course content.

4.1.3.6.2. Teachers’ perception on the most important part of the implementation process.
Table 22. Teacher perceptions on the most important part of the implementation process.

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers should be a helpful facilitator:</td>
<td></td>
</tr>
<tr>
<td>- Being ready to provide help when needed.</td>
<td>09 (T1,2,3,4,5,6,7,8,9)</td>
</tr>
<tr>
<td>- Providing students with constructive feedback in time.</td>
<td></td>
</tr>
<tr>
<td>- Having good teaching skills.</td>
<td></td>
</tr>
<tr>
<td>- Loving teaching career.</td>
<td></td>
</tr>
<tr>
<td>- Being ready for dealing with group conflicts.</td>
<td></td>
</tr>
<tr>
<td>Students should have good background of prior subjects which will lay the basis for solving learning problems.</td>
<td>01 (T11)</td>
</tr>
<tr>
<td>Teachers should have a thorough understanding of the major content and knowledge of other subjects related to their major.</td>
<td>01 (T10)</td>
</tr>
</tbody>
</table>

Most teachers commented that it is the role of the facilitator to be the most important part of the process of PBL implementation. PBL teachers were required to be helpful facilitators. In addition, one teacher required the PBL teacher to have a thorough understanding of the course content and other related subjects.

4.1.3.6.3. Teachers’ perceptions on the positive aspects in the process of PBL implementation.
Teacher responses described their perceptions on the positive aspects in the process of PBL implementation is presented in the table 23.

**Table 23. Teacher perception on the positive aspects in the process of PBL implementation.**

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students had opportunities to join in many learning activities to develop a range of skills such as problem-solving, team-work, self-directed learning, information analysis, synthesis and communication.</td>
<td>11</td>
</tr>
<tr>
<td>Encouraging students to become active and confident learners.</td>
<td>07</td>
</tr>
<tr>
<td>Making learning environment more interesting and collaborative.</td>
<td>05</td>
</tr>
<tr>
<td>Teachers had opportunities to recognise fast/slow or reluctant learners to provide them with support.</td>
<td>02</td>
</tr>
</tbody>
</table>

Teachers listed a variety of positive aspects in the process of PBL and these aspects are mostly related ways of supporting the active learning of students.
4.1.3.6.4. Teacher perceptions on the negative aspects in the process of PBL implementation.

Teachers’ perspectives on negative aspects in the process of PBL implementation are represented in the Table 24.

**Table 24. Teacher perceptions on the negative aspects in the process of PBL implementation.**

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time-consuming</td>
<td>11</td>
</tr>
<tr>
<td>It is challenging to implement a PBL approach in class with students who have</td>
<td>06</td>
</tr>
<tr>
<td>limited knowledge taught in prior subjects or are slow/passive learners.</td>
<td></td>
</tr>
<tr>
<td>It is difficult to use a PBL approach in teaching when lacking in tutors and</td>
<td>03</td>
</tr>
<tr>
<td>teaching facilities such as additional classrooms for group work/discussion spaces,</td>
<td></td>
</tr>
<tr>
<td>data projector…</td>
<td></td>
</tr>
<tr>
<td>It seems hard to assess group members equally as there are some slow learners or</td>
<td>03</td>
</tr>
<tr>
<td>slackers.</td>
<td></td>
</tr>
</tbody>
</table>

All teachers commented implementing a PBL approach in teaching is time-consuming in comparison with teaching through other approaches. Half the teacher participants added that it is challenging to implement a PBL approach with learners who have limited knowledge taught in prior subjects or they are likely to be slow/passive
learners. Other teachers discussed the limitation of insufficient resources while others were concerned with allocating groups marks when often there was not equal input.

4.1.3.6.5. **Teacher perceptions on the biggest difference between teaching through a PBL approach and other traditional methods.**

There is a range of teacher responses on the biggest difference between teaching through a PBL approach and other traditional methods.

**Table 25. Teacher perceptions on the biggest difference between teaching through a PBL approach and other traditional methods.**

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Traditional approaches: teacher-centred, lecture delivery, the teacher as authority and learning results shown in the final assessment.</td>
<td>07 (T1,2,3,4,7,8,9)</td>
</tr>
<tr>
<td>-PBL: learner-centred, teacher-student interaction, the teacher as facilitator, process assessment and learning results shown throughout the learning process.</td>
<td></td>
</tr>
<tr>
<td>PBL learners have opportunities to develop a variety of skills such as problem-solving, team-work, thinking, self-directing while traditional learners do not.</td>
<td>02 (T5,6)</td>
</tr>
<tr>
<td>PBL learners are responsible for their learning, and working actively while traditional students often expect</td>
<td>02 (T10,11)</td>
</tr>
</tbody>
</table>
Most teachers commented that the biggest different between teaching through a PBL approach and other methods as follows: traditional methods seen as teacher-centred and lecture delivery methods; teachers using traditional methods as authority in the learning process and learning results only shown in the final assessment. PBL was perceived as a learner-centred approach; with more teacher-student interaction teachers worked as facilitators. Learning results were shown throughout the learning process as progress assessment was regularly administered.

4.1.3.6.6. Teacher perceptions regarding the worth of PBL.

Table 26 describes the teacher responses considering the worth of PBL following their implementation.

Table 26. Teacher perceptions regarding the worth of PBL.

<table>
<thead>
<tr>
<th>Teacher responses</th>
<th>Number of responses (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem-based learning will be a worthwhile approach to use with students</td>
<td>11</td>
</tr>
</tbody>
</table>

All teachers believed PBL would be a worthwhile approach to use with students after their implementation of it in their courses.

4.2. Students’ perceptions of learning through a problem-based approach
An overview of the students' perceptions of their experience of PBL implementation will be presented in this section. These results were based on data from 182 students questionnaires returned for analysis.

The student questionnaire information is presented in the form of tables. The student classes from Can Tho University classes are represented as C1 to C6 (classes 1-6). Examples C7 to C11 (classes 7-11) represent the PBL classes from Ho Chi Minh City University of Pedagogy classes.

The data from the student questionnaire was analysed based on the selected research questions. I presented the results under the following headings:

4.2.1. Students in the study.
4.2.2. Students’ experience of a PBL approach prior to the implementation.
4.2.3. Students’ perceptions on the teacher preparation for PBL classes
4.2.4. Students’ perceptions on the process of learning through a PBL approach.
4.2.5. Students’ learning experience through PBL class
4.2.6. Students’ perceptions on the comparison between learning through a PBL approach with other methods.
4.2.7. Students’ perceptions on the acquisition of skills in learning through a PBL approach that will help them in their future career.

4.2.1. Students in the study.
There were 186 students in eleven classes who were given self-completion questionnaires. 182 completed questionnaires were collected (98%). It is possible that the 4 students whose questionnaires were not returned were absent from class on the day the questionnaires were collected or they simply may have chosen not to participate in the study.

4.2.1.1 The disciplines undertaken by the students.

The following table (27) gives a break down of the disciplines undertaken by the student participants.

<table>
<thead>
<tr>
<th>Classes</th>
<th>Number of Students</th>
<th>Disciplines</th>
<th>Number of questionnaire distributed</th>
<th>Number of questionnaire collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>20</td>
<td>General English</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>C2</td>
<td>14</td>
<td>English Literature</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>C3</td>
<td>17</td>
<td>Business (Finance Ad.)</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>C4</td>
<td>14</td>
<td>Business (Industry Ad.)</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>C5</td>
<td>16</td>
<td>English Literature</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>C6</td>
<td>12</td>
<td>English Literature</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>C7</td>
<td>20</td>
<td>Introductory Education</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>C8</td>
<td>14</td>
<td>Introductory Education</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>C9</td>
<td>19</td>
<td>Development Psychology</td>
<td>19</td>
<td>18</td>
</tr>
</tbody>
</table>
4.2.1.2. The student academic year level.

The PBL approach was implemented in a range of classes covering a range of different academic year levels.

Table 28. Student academic year level.

<table>
<thead>
<tr>
<th>Classes (n=11)</th>
<th>Student academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>04 (C1,8,10,11)</td>
<td>First year</td>
</tr>
<tr>
<td>01 (C7)</td>
<td>Second year</td>
</tr>
<tr>
<td>04 (C2,5,6,9)</td>
<td>Third year</td>
</tr>
<tr>
<td>01 (C3)</td>
<td>Fourth year</td>
</tr>
<tr>
<td>01 (C4)</td>
<td>Short training</td>
</tr>
</tbody>
</table>

First and third year classes were used the most by teachers as the group to introduce to the PBL approach. The first year classes represented the disciplines: General English, Introductory Education, Vietnamese Literature and Introductory Psychology. The third year classes included 3 English Literature classes and one Development Psychology class.
4.2.2. Students’ experience of a PBL approach prior to the implementation.

Students from the eleven classes were asked if they had learned through a PBL approach prior to participating in this study. Data represented in table 29 showed that there were, in each class, some students who had learned through the approach previously.

Table 29. Students’ experience of a PBL approach prior to the implementation.

<table>
<thead>
<tr>
<th>Classes</th>
<th>Student responses related to prior experience of PBL (n=182)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>C1 (20)</td>
<td>09</td>
</tr>
<tr>
<td>C2 (14)</td>
<td>10</td>
</tr>
<tr>
<td>C3 (17)</td>
<td>07</td>
</tr>
<tr>
<td>C4 (14)</td>
<td>09</td>
</tr>
<tr>
<td>C5 (15)</td>
<td>09</td>
</tr>
<tr>
<td>C6 (12)</td>
<td>11</td>
</tr>
<tr>
<td>C7 (18)</td>
<td>12</td>
</tr>
<tr>
<td>C8 (14)</td>
<td>08</td>
</tr>
<tr>
<td>C9 (18)</td>
<td>14</td>
</tr>
<tr>
<td>C10 (20)</td>
<td>04</td>
</tr>
<tr>
<td>C11 (20)</td>
<td>09</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
</tr>
</tbody>
</table>
It can be seen from the data that PBL has been introduced to a range of Vietnamese classes prior to the study. Specifically, 30 out of 74 students (40%) in first-year classes (C1,8,10,11) commented they have had opportunities to learn through PBL in their prior classes. This implies that PBL had been implemented in students’ high schools. In addition, it also means that PBL had also been implemented in the early years of the undergraduate course when 66 out of 94 students (70%) in their second to fourth years described having experience of PBL before participating in the study.

4.2.3. Students’ perceptions of the teacher preparation for PBL classes.

Students commented on the preparation of classes by their teachers in table 30.

Table 30. Students’ perceptions of the teacher preparation for PBL classes

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teachers explained to students how to learn through a PBL approach such as the role of students, the role of the teacher in PBL class.</td>
<td>82</td>
</tr>
<tr>
<td>The teachers introduced some advantages of learning through a PBL approach to students</td>
<td>146</td>
</tr>
<tr>
<td>The teachers pointed out some differences between learning through a PBL approach and other methods and suggested some preparation to be successful when learning through a PBL approach.</td>
<td>74</td>
</tr>
</tbody>
</table>
There were 302 responses from the 182 student participants. Students commented that their class teachers had introduced them to the PBL approach prior to their PBL classes. The results of the students’ perceptions of preparation for PBL classes match those of teachers’ perceptions in the explanation of roles, advantages and differences between PBL and other approaches.

4.2.4. Student perceptions on the process of learning through a PBL approach.

4.2.4.1. Student perceptions on the organisation of the group work

4.2.4.1.1. The allocation of the group work.

Students described the range of ways that student groups were organised.

Table 31. The allocation of the group work

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teachers assigned students in groups of mixed ability (below average, average, good and excellent levels) so that students could help one another.</td>
<td>C (1,4,5,9&amp;10) 87</td>
</tr>
<tr>
<td>The teachers assigned students in groups randomly.</td>
<td>C (6&amp;11) 32</td>
</tr>
<tr>
<td>The teachers encouraged students to form groups themselves.</td>
<td>C (2,3,7&amp;8) 63</td>
</tr>
</tbody>
</table>
Teachers in seven classes took responsibility for grouping students while the other four teachers encouraged their students to form their own groups. With the students in seven classes grouped by their teachers, five of them were allocated in groups with mixed ability which included students of below average, average, good and excellent levels while students in the other two classes were assigned to groups randomly.

It was interesting that the teachers had not commented on assigning students to groups according to ability whereas students were very aware of this grouping.

4.2.4.1.2. The organisation of the group work.

Two different approaches were described regarding the roles and tasks of students within the groups. Students in seven classes (C1, 4, 5, 6, 9,10 and 11) described that when working in their own group, they first discussed the problem given and divided it into different learning issues which were then assigned to individual group members. Each group member chose learning resources from materials provided as well as gathered additional materials to find tentative solutions for their issue. In addition, group members then reported the tentative solutions to the whole group. The group had previously synthesised their learning issues to be a complete problem with its solutions. In the class presentation, all group members were responsible for taking their turns to present their group’s findings to the class.

On the other hand, students in the other 4 classes (C2, 3, 7 and 8) described the different roles of the group leader and group members during the group discussions. Particularly, the leader was responsible for assigning learning issues to individual
members, managing group discussions and contacting the facilitator when needed. The group members were responsible for gathering necessary learning resources to solve the learning issues assigned. Further, in preparation for class presentation, group members were again assigned to a variety of roles such as designers of power point presentation, of game activities introduced to class on the day of the group presentation or presenters of parts of group presentation. Some of these arrangements would not achieve the monitoring of group dynamics which is essential to the PBL paradigm.

4.2.4.2. Student perceptions on their collaboration with other group-members.

Students were asked to comment on their collaboration during in-class and out-of-class PBL sessions. The student responses are represented in the tables 32 and 33.

4.2.4.2.1. The student collaboration in class.

Student responses on the collaboration during in-class session of PBL are represented in the table 32.

Table 32. Students’ perceptions on the collaboration in class.

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every group member was assigned a learning issue to investigate on his/ her own. Group members had to find appropriate learning resources to solve the assigned issue</td>
<td>182</td>
</tr>
</tbody>
</table>
and reported the progress of the work to the group every group meeting and any difficulty arose.

Group members stated their own ideas and tentative solutions when presenting their own work to the group. They were advised to learn from comments of other members on their presentation.

Group members were advised to respect their peers’ opinions by listening to their presentations carefully and giving constructive comments on them.

All students commented that they were given a learning issue to solve. They also reported to the teacher the progress of their work every group meeting and discussed any difficulty that arose.

4.2.4.2.2. The student collaboration out of PBL class.

Student participants were asked to comment on their collaboration with other group members out of their PBL sessions. Students used a range of different ways of working together or collaborating outside their PBL classes. Their responses are represented in the table 33.

Table 33. Students’ perceptions on the collaboration out of class.

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting other group members out of class to share learning resources gathered.</td>
<td>182</td>
</tr>
<tr>
<td>Participating in learning forum to comment on the issues</td>
<td>43</td>
</tr>
</tbody>
</table>
posted by the teacher.

Contacting via email and telephone with other group members to discuss the assigned issues and introduce one another the learning resources such as internet links, books, articles and interviews from other teachers.

All students commented that they had meetings with other group members out of PBL class to share learning resources gathered. They also used emails and the telephone to discuss the assigned issues.

Students also commented on how their group reached agreement on possible solutions. Their responses are represented in the table 34.

Table 34. Students’ perceptions on how their group reached agreement on a tentative solution.

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreements were based on possible solutions which were extensively discussed and agreed by a large number of group members. Agreements were sometimes based on solutions which were voted by greater numbers of group members.</td>
<td>182</td>
</tr>
<tr>
<td>Any group members still tried to defend their own ideas; other group members provided further explanations to persuade them. If not, the group would seek the teacher’s advice</td>
<td>57</td>
</tr>
</tbody>
</table>
Clearly from the analysis of data on group work, the PBL approach certainly encouraged student collaboration, negotiation and peer support when arriving at tentative solutions.

4.2.4.3. Student perceptions on the support for their learning.

In analysis of students’ perceptions on the support of their learning, students were asked to comment on the availability of adequate learning resources for their group investigations and opportunities for self-directed learning. Student responses are represented in the tables 35 and 36.

4.2.4.3.1. The availability of adequate resources.

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teacher introduced some learning resources to the group and encouraged the group to collect some more from the internet, journals, books and interviews with other teachers who taught similar subject in the department.</td>
<td>182</td>
</tr>
<tr>
<td>If the group could not find more resources from the</td>
<td>42</td>
</tr>
</tbody>
</table>
library, the teachers would provide some books and articles from their personal libraries for students’ investigations.

Students appeared to be set up well with learning resources initially as well as given suggestions of where to access further resources. Some teachers had further supported students by offering their personal libraries if requested.

4.2.4.3.2. The opportunities for self-directed learning.

Students described a variety of opportunities they had for self-directed learning.

Table 36. Students’ perceptions on the opportunities for self-directed learning.

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teacher provided the groups with learning resources for independent learning.</td>
<td>182</td>
</tr>
<tr>
<td>The teacher allocated some time and classrooms for the groups’ out-of-class meetings</td>
<td>162</td>
</tr>
<tr>
<td>Every group members were encouraged to gather additional resources and solved their assigned learning issues independently.</td>
<td>147</td>
</tr>
<tr>
<td>In class meetings, the teacher walked around when the groups were working and only provided help if necessary.</td>
<td>136</td>
</tr>
</tbody>
</table>
It can be seen that students had been provided with many opportunities which helped them improve their self-directed learning skills. Particularly, students’ independent learning was strongly scaffolded with the provision of resources, the teacher encouragement to actively engage in the group work and the teacher involvement in the students’ groups only when necessary.

4.2.4.4. Student perceptions on the teachers’ facilitation in the PBL class.

Student participants were asked to describe the ways the teacher facilitated their group work during the PBL class. Their responses are categorised in the table 37.

Table 37. Student perceptions on the teacher facilitation in the PBL class.

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teacher observed while the groups were working in class. The teacher also listened to group members when they were presenting their finding to the group.</td>
<td>182</td>
</tr>
<tr>
<td>The teacher only provided help when needed and this help aimed at encouraging students to have further discussions, not answer the problem.</td>
<td>159</td>
</tr>
<tr>
<td>The teacher sought and provided students with many learning resources as possible to support student learning.</td>
<td>157</td>
</tr>
<tr>
<td>The teacher gave feedback in time to encourage students in learning</td>
<td>57</td>
</tr>
<tr>
<td>The teacher helped to assess students’ learning performance equally</td>
<td>42</td>
</tr>
<tr>
<td>The teacher helped to encourage less motivated students to</td>
<td>37</td>
</tr>
</tbody>
</table>
participate in the group work.

The teacher helped to solve group conflicts during the learning process.

32

Clearly, teachers used a range of different strategies to facilitate student learning during group work.

4.2.4.5. Students’ perceptions on the assessment styles used.

In analysis of students’ perceptions on the assessment used in the implementation of a PBL approach, student participants were asked to comment on assessment styles used in PBL course. The assessment styles were categorised as in-progress assessment used during the course during the course and final assessment administered at the end of the course. The results are represented in the tables 38 and 39.

4.2.4.5.1. Students’ perceptions on the assessment styles used during the course.

Student participants described a variety of in-progress assessments which are represented in the following table 38.

Table 38. During the course assessment.

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Classes (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-progress assessment based on self-assessment, group assessment, class attendance, regularly submitted group reports and the result of group presentation.</td>
<td>2 (C2,3)</td>
</tr>
<tr>
<td>In-progress assessment based on feedback such as self-assessment, group assessment and the result of group presentation.</td>
<td>7 (C1,4,5,6,7,8,9)</td>
</tr>
</tbody>
</table>
These results fell into 2 categories. Teachers who used a range of assessment approaches which recognised the importance of positive group interactions while the other teachers placed value on the culmination of these processes in the assessment of the presentation only.

### 4.2.4.5.2. End of the course assessment.

Regarding to final assessment used in PBL classes, student responses are represented in the following table 39.

**Table 39. Students’ perceptions on the assessment styles used at the end of the course.**

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Classes (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting for a written final test</td>
<td>8 (C1,2,3,5,6,8,9,10)</td>
</tr>
<tr>
<td>Based on the results of the groups’ final presentations and feedback from the groups</td>
<td>1 (C7)</td>
</tr>
<tr>
<td>Sitting for a multiple-choice final test</td>
<td>1 (C11)</td>
</tr>
<tr>
<td>Sitting for an oral final test</td>
<td>1 (C4)</td>
</tr>
</tbody>
</table>
In analysis of students’ perceptions on the assessment styles used at the end of the implementation course, Students from 8 classes commented they had undertaken a written test as a final assessment. Multiple-choice test was administered in one class as the final assessment. Oral test was used in one class. Only one class based the criteria to assess students’ final learning performance on the results of the groups’ final representation and group feedback.

4.2.5 Students’ learning experience through PBL class

Student participants are asked to comment on their learning expectation through PBL class prior to the course, during the course and after the course. Their responses are represented in the tables 40, 41 and 42.

4.2.5.1. Expectations of PBL prior to the course.

Table 40. Students’ expectations of PBL prior to the course.

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having an understanding of the expected outcomes of the subject</td>
<td>167</td>
</tr>
<tr>
<td>Having an understanding of the benefits and possible challenges when learning through a PBL approach</td>
<td>157</td>
</tr>
<tr>
<td>Having a good background of prior taught subjects</td>
<td>137</td>
</tr>
<tr>
<td>Having strong learning motivation</td>
<td>129</td>
</tr>
</tbody>
</table>
Most students commented that they had expected an understanding of the outcomes of the discipline. They had also expected to be introduced the benefits and possible challenges when learning through a PBL approach. Students were aware of the necessity of having good background of prior subjects as these were useful resources and provide foundation which can be built on when gaining new knowledge.

4.2.5.2. Expectations of PBL during the course.

Table 41. Students’ expectations of PBL during the course.

<table>
<thead>
<tr>
<th>Student expectations during the PBL course</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working collaboratively with group members</td>
<td>167</td>
</tr>
<tr>
<td>Having good preparation of individual work assigned</td>
<td>162</td>
</tr>
<tr>
<td>Sharing the learning resources gathered with group members in order to solve the assigned problem successfully</td>
<td>157</td>
</tr>
<tr>
<td>Participating in scheduled group meetings in and out of class regularly</td>
<td>157</td>
</tr>
<tr>
<td>Engaging actively in group discussions to reach an agreement.</td>
<td>145</td>
</tr>
<tr>
<td>Respecting other members’ ideas, being patient in listening to group members’ diverse opinions and giving constructive comments</td>
<td>87</td>
</tr>
</tbody>
</table>
Students had expected their group members to effectively collaborate one another for the success of solving the group’s learning problem such as having good preparation, finding appropriate additional resources and attending regularly group meeting scheduled.

4.2.5.3. Expectations of PBL after the course.

Table 42. Students’ expectations of PBL after the course.

<table>
<thead>
<tr>
<th>Student expectations of PBL following the course</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling more confident in communication, especially in presenting personal ideas to the public.</td>
<td>176</td>
</tr>
<tr>
<td>Learning new ways of collaboration and organisation in the group work</td>
<td>162</td>
</tr>
<tr>
<td>Improving personal skills in solving problem, team-working and critical thinking</td>
<td>157</td>
</tr>
<tr>
<td>Learning new things from other group members such as learning approaches, ways of analysing and synthesising a problem.</td>
<td>97</td>
</tr>
</tbody>
</table>

Students had expected to gain a range of skills through learning a PBL approach. They had mainly expected to improve their confidence and communication skills.

4.2.6. Student perceptions on the comparison between learning through a PBL approach with other methods.
Students were asked to comment on the comparison between learning through a PBL approach and other methods. Responses were received from 162 of the 182 student participants and represented in the following table 43.

Table 43. Student perceptions on the comparison between learning through a PBL approach with other methods.

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning through a PBL approach, students are provided with:</strong></td>
<td>162</td>
</tr>
<tr>
<td>-Opportunities to collaborate with other students</td>
<td></td>
</tr>
<tr>
<td>-Opportunities to express personal ideas to the group and class.</td>
<td></td>
</tr>
<tr>
<td>-An interesting learning environment</td>
<td></td>
</tr>
<tr>
<td>-Easier understanding of the lesson and retain subject content acquired longer</td>
<td></td>
</tr>
<tr>
<td>-Achievement of a range of skills in problem solving, communication, team-working</td>
<td></td>
</tr>
<tr>
<td>and critical thinking.</td>
<td></td>
</tr>
<tr>
<td><strong>Learning through other methods, students</strong></td>
<td></td>
</tr>
<tr>
<td>-Just listened to the teacher passively</td>
<td></td>
</tr>
<tr>
<td>-Have limited opportunities to express personal ideas to class</td>
<td></td>
</tr>
<tr>
<td>-Have limited opportunities to collaborate with group members.</td>
<td></td>
</tr>
</tbody>
</table>
- Find learning environment boring because of having no student-talking time.
- Have limited opportunities to improve working skills as in learning through a PBL approach.

It can be seen that all students commented on positive aspects of PBL and only on negative aspects of traditional methods.

4.2.7. Students’ perceptions on the acquisition of skills in learning through a PBL approach that will help them in their future career.

Students commented on the acquisition of skills in learning through PBL that will help them in their future career. Their responses are represented in the following table 44.

Table 44. Students’ perceptions on the acquisition of skills in learning through a PBL approach that will help them in their future career.

Only 173 responses were made from the 182 student participants to this particular issue.

<table>
<thead>
<tr>
<th>Student responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Being confident in analysing a problem and gathering resources to solve it.</td>
<td>173 (95%)</td>
</tr>
<tr>
<td>- Feeling confident when presenting personal ideas in public</td>
<td></td>
</tr>
<tr>
<td>- Collaborating with other members in learning more effectively.</td>
<td></td>
</tr>
</tbody>
</table>
- Organising personal learning more effectively.
- Thinking and finding solutions for a problem faster and more effectively.
- Developing good relationship with many class members.

Students responded their communication skills and confidence had improved. Students additionally commented they learnt how to collaborate with others as well as organise personal learning more effectively. Additionally, working in a PBL class helped develop good relationships with many class members.

It can be seen that student participants identified a variety of skills they gained in learning through a PBL approach. More than 95% of students commented positively on the skills achieved through PBL classes. Importantly, students considered the skills in communication, teamwork, problem-solving and critical thinking to be useful for their future careers. Obviously, besides the acquisition of the subject content, the achievement of a range of skills through PBL classes is not only valuable for supporting students’ present learning but it is also a necessary preparation for them to be successful in future work situations.

**Summary and discussion of the teachers’ and students’ perceptions.**

A sample of eleven teachers who agreed to participate in the study attended the PBL workshops, implemented the PBL approach in teaching their university classes, and completed a “Teacher questionnaire”. More than eighty per cent of the teachers had been participating in the teaching profession for more than ten years. Ten of the
eleven teachers had achieved professional qualification levels of Masters or higher, including four teachers with doctoral degrees.

In the semester the teachers implemented a PBL approach in teaching their university classes. More than sixty per cent of the courses implemented PBL over sixty periods. In addition, nine teachers had implemented PBL in their whole course whilst the other two teachers used PBL in some parts of their course.

More than seventy per cent teachers implemented a PBL approach in teaching their students who were in the second, third or fourth year of the university course. There were four teachers who taught first year students using a PBL approach, and one teacher implemented the approach in teaching a short training course.

In regard to the disciplines which were implementing a PBL approach, eight teachers had been teaching Humanity Sciences such as Psychology, English and Vietnamese Literature. The other four teachers had been teaching the Social Sciences such as Business and Introductory Education.

The teachers were able to identify a range of features of PBL prior to participation in the PBL workshop. They described PBL as an innovative approach to promote the learners’ thinking, self-study, creativity and group work, as a student-centred approach, and as a model of inquiry-based learning or learning by discovering. It was also seen as a way of asking questions.
Regarding the conducting of the PBL workshops, the PBL resources provided prior to the PBL workshops were described as providing a thorough understanding of the PBL approach, especially the advantages and disadvantages. Also, materials were helpful in writing effective learning problems. The resources outlined the benefits of implementing a PBL approach in teaching to range of skills such as thinking, self-directing, problem-solving and teamwork skills were now understood. The resources were seen as useful in supporting the process of PBL implementation.

In the workshops, teachers actively engaged in discussions on how to implement a PBL approach in teaching. Particularly, two teachers (T2 & T3) contributed their first-hand experience of implementing a PBL to the workshop discussions. Also, two teachers (T7 & T8) who received their PhDs in implementing innovative teaching approaches shared what they found from their studies with other teacher participants. Overall, the PBL workshops furthered the teachers’ comprehension of a PBL approach. The teachers also commented that the workshops provided them with a range of assessment styles often used in PBL implementation.

In regards to the collection of additional PBL resources prior to the implementation of PBL, teachers described gathering additional PBL resources from conference proceedings and online journal articles, discussed with their colleagues the implementation of a PBL approach, participated in online discussions as well as attended other teaching and learning workshops as ways of enriching their understanding of a PBL approach. Additionally, one teacher learned more about the PBL implementation from feedback of students who had learned through a PBL approach in prior classes.
In analysing the preparation for the PBL implementation, all teachers (11) described that writing learning problems was one of the necessary preparations prior to the PBL implementation. Eight teachers claimed that gathering learning resources related to subject content was another needed preparation for the PBL implementation. The preparation of learning facilities such as classroom and teaching aids was seen by some teachers as necessary before the first PBL sessions. Also, several teachers found the designing of scaffolding questions which aimed to guide learning discussions to be one of the necessary preparations for the PBL implementation.

Regarding teachers’ perceptions on the introduction of PBL to students in their first PBL sessions, over ninety percent of teacher participants introduced PBL to students by explaining the requirements of the course as well as introducing the PBL approach they were going to work with. The teachers also introduced the learning materials and the assessment styles to the students. Moreover, some teachers introduced a PBL approach to their classes by explaining the differences between the PBL approach and other traditional methods.

In the analysis of the allocation of student groups, seven teacher participants allocated their classes in groups of 3 to 5 students. There were three teachers who implemented group sizes of 6 to 7 students. Only one teacher assigned students in groups of 10 members. In the organisation of group work, especially in relation to establishing the group norms, seven teachers encouraged their students to set the group norms themselves while there were four teachers who established the group norms for their students.
In analysis of the process of PBL facilitation, the results of the study showed that all teachers commented they had commenced their PBL classes by introducing learning problems to students. They then guided students to divide the learning problems into simpler issues. The teachers encouraged each group to choose one of the learning issues for their group work. In addition, 82% of teacher participants commented that they had allocated the necessary time for every learning problem to be finished. Nine of teacher responses showed that they had required students to submit group progress reports every group meeting.

During the process of facilitation of students’ group work, all teachers stated that they had facilitated the in-class group work by moving around student groups, observing them while they were working on the chosen issues. Teachers also provided help for student groups if needed. When facilitating students’ presentations, 82% of teacher participants wrote that they had advised the learners on using the power-point software to present the tentative solutions of their group work. All teachers facilitated student learning via emails and telephone. Two teachers additionally facilitated student learning in person.

In analysis of the assessment styles used in PBL implementation, 82% of teachers divided the PBL assessment into two parts: the in-process assessment which was accounted for 30% of the total assessment and the final assessment accounted for 70% of the total assessment. Two teachers divided in-learning process assessment worth 40% and the final assessment accounting for 60% of the course assessment.
Self-assessment, group assessment and the group presentation of the tentative solutions were the most common forms used in the in-process assessment. Class attendance and group reports were additionally assessed. Some teachers based their process assessment on the group presentation of their tentative solutions to the problems only.

Final assessments included a written test as the end-of-course examination, a multiple-choice test and one teacher administered an oral test to assess students’ learning performance at the end of the course.

In the preparation for implementing a PBL approach, designing of PBL problems was seen to be the most important part. Resources for students and a thorough understanding of the course content were also identified as important elements. During the process of implementing PBL in class, the role of the facilitator was identified as most important. A thorough understanding of the course content was also seen as important.

In considering teachers’ perceptions of the positive and negative aspects in the implementation of a PBL approach, the positive aspects included participation in a great number of learning activities to improve a range of skills in problem-solving, team-work, self-directed learning, information analysis, synthesis and communication. However, all teachers found the implementation of PBL time-consuming in comparison with teaching through other traditional approaches. Students’ limited knowledge from prior subjects and lack in tutors to support facilitation were other challenges. Limited facilities such as working spaces for group
discussion and limited material resources were also identified as challenges in the implementation of a PBL approach.

Regarding teachers’ perceptions on the biggest difference between teaching using traditional methods and PBL, traditional approaches were identified as teacher-centred methods; the teacher worked as authority, and learning results were only examined in the final assessment. PBL learners had opportunities to develop a range of skills in problem-solving, team-work, critical thinking and self-directing whilst their counterparts learning under traditional approaches did not. Also PBL learners were seen to be responsible for their learning, but learners in traditional classes passively expected the delivery of content from their teachers in lectures.

In analysis of students’ perceptions on the organisation of their group work, most of students commented they discussed and divided the assigned learning problem into different issues. These learning issues were then assigned to group members. Individual members selected appropriate learning resources provided to solve the assigned issue. After that, they presented tentative solutions of their learning issues to the whole group. The learning issues previously divided between group members were synthesised to be a complete problem with their tentative solutions.

Regarding students’ perceptions on collaboration during the PBL class, students described how they collaborated with other group members out of the PBL sessions. For example, all students claimed they had meetings with other group members out of the PBL class to share learning resources gathered. They also e-mailed and
telephoned one another to have further discussions on the assigned issues. All students commented that they were assigned individual learning issues to solve.

In reaching an agreement amongst group members during the group work, students considered all possible solutions which were discussed then agreed when a large number of group members were in agreement. When an agreement could not be reached, the group sought the teacher’s further consultation.

In addition, all students commented their groups were provided with appropriate learning resources to help solve the assigned problems. The teacher also encouraged the groups to gather additional resources from the internet and online journals.

Regarding students’ perceptions on the teacher facilitation and the opportunities for their self-directed learning, student participants commented that they were encouraged to independently solve the learning problem assigned with adequate learning resources provided. Moreover, the teachers set time and booked classrooms for the groups’ out-of-class meetings. The teachers rarely became involved in the group discussions and only provided help as scaffolding questions when needed. In the facilitation in the PBL class, students commented that the teacher’s provision of timely feedback really encouraged their learning. They also added the teachers helped with issues related to peers such as engaging lazier students in group participation and consulting for group conflict resolution.

Students commented that the assessment used in PBL implementation comprised both in-progress and final assessments. In-progress assessment was based on a variety of
criteria such as feedback of self-assessment, group assessment, class attendance, group reports and group presentation. Final assessment was based on one of assessment styles such as a written test, a multiple-choice test or an oral test. Only one class had its final assessment based on criteria of groups’ representation and feedback.

Regarding students’ learning experience through a PBL approach, students claimed that the outcomes of the disciplines, the benefits and possible challenges in learning through the approach should be introduced to learners prior to the course. Students also added they required a good background in their previous subjects. During the course of PBL implementation, students commented they had gained experience in collaborating with group members by preparing carefully their individual work prior to the group meeting. In addition, students further commented, after the course, their communication skills had improved. They had learned a variety of skills in collaborating and organising of the group work. Further, the students confirmed their skills in solving problems, team-work and critical thinking had been promoted.
CHAPTER 5
ANALYSIS AND DISCUSSION

Discussion in relation to the key aims of the study

In this chapter, the teachers’ perceptions in implementing a problem-based learning (PBL) approach and students’ experience of learning through this approach will be analysed and discussed in relation to the key aims of the study. Moreover, I added examples from interview transcripts to add richness to teachers’ understanding of the important issues identified as well as to students’ experiences in learning through PBL. In particular, student interviewees from Can Tho University classes are represented as S1 to S6 (student interviewees chosen from C1 to C6) and S7 to S11 are representing student interviewees chosen from the PBL classes (C7-C11) in Ho Chi Minh City University of Pedagogy.

There were three key aims to the study:

- To explore the experiences of eleven university lecturers who implemented a PBL approach in a range of courses in two universities in the South of Vietnam.

- To understand the benefits and challenges of implementing a PBL approach from the perspectives of the university lecturers

- To discover the impact of the implementation of a PBL approach in Vietnam from the perspectives of the 182 students
5.1. The first aim of the study: To explore the experiences of eleven university lecturers who implement a PBL approach in a range of courses in two universities in the South of Vietnam.

Eleven teachers voluntarily participated in the study and implemented a PBL approach in a range of university classes in Vietnam that they taught in. All teachers regularly followed all scheduled stages of the research, which included participating in PBL workshops, implementing a PBL approach in teaching a range of their university classes, completing and returning their questionnaires. Also, they all participated in telephone focus interviews.

There was an excellent response from teachers at the two universities which showed a strong commitment on their part in trying new teaching and learning approaches to motivate their students’ learning. They voluntarily implemented the PBL approach in their university classes and they collaboratively participated in the process of data collection in order to share their perceptions of the PBL implementation. There were several possible reasons for this excellent response.

The Vietnamese government had requested teachers to implement new teaching and learning approaches in their classes. It was hoped that this would create a movement of educational enhancement in Vietnamese education (reported by Tran Quang Quy 2008). Another reason is that the teachers themselves may have wished to improve their own teaching and move away from the traditional approach that had been in place for years. Presumably there was already a desire to promote students’ learning experiences – using a change in approach.
It is interesting to note that it was not only the “early career teachers” who wanted to implement a problem-based learning approach, but many teachers with experience also were willing to try out a new teaching and learning approach (see Table 1 for reference). As stated in the literature review, many of these teachers would have been used to using traditional approaches such as lecture-based learning because traditional learning is still widely used in Vietnam (Pham & Fry, 2004). Despite this these teachers voluntarily agreed to participate in implementing a new approach like PBL which is likely to be challenging and demanding.

The teachers’ involvement in trialling the PBL approach was not only to support the requests for enhancing the quality of higher education from the Vietnamese government (reported by Tran Quang Quy, 2008) but it also showed that they actually wanted to make changes for their university classes. The teachers may have believed it would enhance their reputation by working on an innovative approach to teaching.

The teacher participants of the study represented many different levels of academic qualifications. It can be seen from the results of the study that the teachers’ level of academic qualification did not determine their willingness to apply PBL. Teachers with PhDs as well as those with lower qualifications also made up the sample. Also, teachers represented a range of year teaching experience. Possibly teachers with less professional experience agreed to implement a PBL approach because they wanted to vary their teaching approaches to improve their teaching performance.
In addition, it is interesting to note that four teachers with PhDs participated in the study (see Table 2). Three (T7, 8 and 9) with over 20 years of teaching experience were from Ho Chi Minh City University of Pedagogy. This University and Hanoi University of Pedagogy are the two central institutions focused on education studies in Vietnam. Teachers from these two universities are encouraged to improve their understanding of discipline majors as well as teaching approaches. Further, the teachers are seen to be pioneers in implementing and introducing new teaching and learning approaches to school teachers in Vietnam. I argue that it is for these reasons that three teacher participants with PhDs from Ho Chi Minh City University of Pedagogy and with much teaching experience were still interested in implementing a PBL approach in their university classes. Another teacher with a PhD. degree (T3) from Can Tho University also participated in the study. He had varied his teaching approaches using PBL as he had had opportunities to undertake his postgraduate courses which were taught using PBL in the Netherlands. He wished to further his PBL experience through participating in the research.

The participants in the study came from both staff experienced with PBL and those with no previous experience of the approach. In particular, almost half of teacher participants had experience with PBL before the study (see Tables 5 and 6). However, I argue that teachers’ understanding of PBL prior to participating in the study was rather limited. One teacher shared their PBL experience in the questionnaire:

(T6) **PBL enhances the learners’ independent learning, and, the subject content could be delivered through PBL in different ways.**
One teacher who had been taught through a PBL approach when studying abroad commented:

(T9) *I have been taught through this approach when I undertook my Masters overseas and I sometimes implement it in teaching my university classes.*

And one teacher who learned about PBL at the Intel workshop claimed:

(T10) *I have been teaching the problem-solving approach to my students, but it has just been the way of asking questions as learning problems have been solved right away in the class meeting, not to be solved in a couple of classes. With PBL, I have learnt from the Intel workshop entitled “Teach to the future” sponsored by Intel Vietnam, and implemented in some of my recent classes.*

Extract from interview one described that:

(T1) *I have used PBL approach in teaching my undergraduate students for two years. I have learnt it from my former lecturers when they taught me in my university courses.*

Although five of eleven teachers commented on their previous implementation of PBL, they only identified a few PBL features, and left out important ones such as the necessity of using group work in PBL to promote learners’ skills of collaboration and teamwork (Allen, Duch, & Groh, 1996). I argue that although these five teachers had learned through a PBL approach and implemented it in teaching their previous undergraduate classes; they might only imitate teaching steps acquired from their
former teachers in organising a PBL class. They were not really provided with a deep understanding of PBL, especially the features of the approach.

The results of the study showed the usefulness of the workshops as well as the importance of the PBL resources provided prior to the study (see Tables 7 & 8). It can be seen in these tables that teachers’ understanding of a PBL approach was much enhanced following the workshops. However, this inadequacy of training could have affected the outcome of the study is the workshops could have been over a longer period of time, the teacher participants may have been more knowledgeable and confident in implementing PBL. One teacher (T6) commented that “The PBL resources provided help me change the ways of teaching to be good teacher”.

Extract from teacher interview one illustrated the idea:

(T1) Thanks to the resources, I have got better understanding of problem-based learning approach. As I have tried this approach in my classes when I was conducting my community practice, I have got some experience, and I am now trialling this approach in my present undergraduate class. I actually understand more about its theories, especially its implementation procedures.

I argue that the teachers wished to improve the range of opportunities for student learning. They actively engaged in the workshops to learn about PBL to teach in a more innovative way. The teachers had limited introduction to innovative teaching and learning approaches previously, therefore they were eager to participate in the PBL workshops. In particular, following the workshops, they felt more confident in
facilitating student learning and promoting students’ creativity and independence during the learning process.

Extract from teacher interview four:

(T4) Attending the workshop I had a better understanding of the nature and the implementation processes of a PBL approach. Moreover, through the workshop I found that the staff participants all agreed what a PBL approach is. They also suggested making the PBL approach more popular so that more teachers willing to implement the approach in their teaching.

A teacher response described the improvement in recognising teaching weakness through the PBL workshop. The teacher wrote:

(T5) I have learnt the ways how to get feedback which can be used to anticipate the students’ level of understanding. I can also see myself if there could be any teaching weaknesses to be improved.

My understanding is that the PBL workshops were necessary for teachers’ effective PBL implementation. The teachers modified their understanding of PBL processes when attending the PBL workshops as they commented that they had opportunities to learn more about class management techniques and assessment styles currently used in PBL implementation. As Dion (1996) asserts a PBL facilitator should have a deep understanding of the purpose, the procedures and the expectations of the implementation of PBL prior to the commencement of the implementation process.
The PBL training is particularly useful for those who are new to PBL. It, therefore, was appropriate to conduct the PBL workshops with Vietnamese teachers to provide them with a clear understanding of PBL prior to their trial of a PBL approach. Participants at the PBL workshops contributed their own ideas when concerns were raised by colleagues. These contributions of sharing real experiences and solutions to the concerns were welcomed by other participants.

The results of this study confirmed findings in the literature review that showed PBL could take a number of forms. PBL can be implemented in a whole program (Boud & Feletti, 1997; Bridges & Hallinger, 1998) or it can be introduced to the program at different points such as in the third or the fourth year of an undergraduate course (Solomon, Binkley & Stratford, 1996). It can be also used in particular units only (Bridges & Hallinger, 1998), or problems are only embedded into units taught through lecture-based approach. This range of interpretations was found in the study. It is interesting to note that seven teachers implemented a PBL approach in their whole university courses with mini lectures scheduled amongst PBL sessions. This PBL model was similar to PBL on a shoestring which had been thoroughly discussed in the PBL workshops. I argue that teachers’ selection of the model of PBL on a shoestring was suitable for their implementation in terms of new teachers of PBL. The teachers could conduct a range of mini lectures delivered amongst PBL sessions. In this way, these new teachers could manage their teaching as well as help students with their group work. This model is also appropriate in Vietnamese educational conditions which are limited in teaching facilities and tutorial support. As Savin-Baden and Major (2004) assert teachers can use the model of PBL on a shoestring with a nominal
cost and in a cheap and quiet way without impacting greatly on other teacher members.

The results of the study also showed that two teachers used PBL in their whole course. It is quite challenging to implement PBL in this way. The single module approach has very few mini lectures delivered (Savin-Baden and Major, 2004). However, it is interesting to note that the two teachers using this approach were the two teachers (T2 and 3) who had learned through a PBL approach when undertaking postgraduate courses in the Netherlands and Australia. They had also implemented PBL in their university classes prior to participating in the study. One teacher who implemented PBL in a whole course commented:

(T2) *I implemented PBL in teaching the whole course this semester for the third year students who were training to be high school teachers of English.*

The results of the study additionally showed that two teachers implemented PBL in part of their course only. I note that these two teachers (T1 and 10) have less teaching experience in comparison with other teacher participants. They perhaps were not confident teaching in this way or did not wish to risk organising their whole course using a new and demanding teaching approach like PBL. Because they were less experienced, perhaps they had not mastered the course content themselves or they may not have learnt the connections between their course and other courses. One teacher wrote:
I only implemented PBL in some parts of the course and I taught the rest using lectures to help students solve the problem-based parts.

It is interesting to note that PBL was implemented in a range of disciplines (see Table 7). It is noted that all the disciplines were Social Sciences. I argue that the teachers may have learnt that PBL has been effectively popularised in different areas of study in the world (Ahlfeldt, Mehta, & Sellnow, 2005), and they wished to implement this in teaching their Social disciplines in Vietnamese tertiary education. Because PBL was first used in medical sciences and later in other health sciences areas in western countries, it is interesting to see that PBL has now been implemented in the social sciences in Vietnam.

PBL was implemented in a range of student academic year levels. The teachers who introduced PBL to different student year levels (see Table 8 for reference) may wish to see how the PBL approach would be appropriate in teaching with students who had different levels of background. One teacher commented:

(T4) I often implement PBL in teaching either a full-time or part-time course provided that the subject content I am teaching can be seen to be problem-based.

In particular, four teachers introduced PBL to their first year students. I argue that it might be challenging to implement an innovative approach like PBL in classes of first year students as they may be inexperienced in independent work or group work, and they may lack foundation knowledge. However, these four teachers only implemented PBL in part of the course (T1, 10) or in the whole course with mini lectures delivered
amongst PBL sessions (T8, 11). The introduction of PBL to first year students has the advantage that it helps students become accustomed to this teaching and learning approach early which could then be built on in the following years of the university course.

In addition, most teachers implemented PBL with their second, third or fourth year students. My understanding is that these teachers probably taught a range of university classes in the Semester, but they decided to implement PBL in teaching students who were in the later years of the university course when students were undertaking the specialised disciplines after having already studied foundation subjects in the early years. Therefore, the teachers implemented PBL in teaching a variety of specialised disciplines such as English Literature (T2, 5, 6), Finance Administration (T3), Industry administration (T4) or Development Psychology (T9). I argue that this is likely to be more effective when teaching using a PBL approach in this way as students further their knowledge through studying specialised disciplines thus building on their foundation knowledge. This fits with a model of PBL where teachers are advised to build on students’ prior knowledge when designing their PBL sessions (Duch, 1997). Specifically, it is effective to implement PBL in later years of the university course when students would have already gained some foundation knowledge and skills.

Duch (1997) asserts that the effective problem should encourage learners to search out additional resources during the learning process. It is interesting to note that teachers gathered additional resources related to the subject content such as supporting reading for their students. This is an effective way of supporting students to achieve outcomes
of independent learning skills when learning through a PBL approach. However, this reflects a range of teacher-centred attitudes that do not match PBL pedagogy. These attitudes promote dependency (on the teacher) which PBL aims to eliminate. Whatever the limitations of the resources, it should still be the duty of the students to search, thus sharpening their survival skills in that particular environment. That is the essence of life-long learning when the students have graduated and the teachers are no more there. The results of the study showed that the teachers collected additional materials from different sources such as the internet, conference proceedings or discussions with colleagues to support students’ learning (see Table 10 for reference).

One teacher wrote:

(T6) I gathered more PBL resources from books of teaching and learning methods and student feedback.

I argue that students may not gather additional resources themselves as the provision of learning resources in Vietnam was rather limited. For these reasons, the teachers chose and provided students with a range of additional resources related to the subject content. This helped students by saving their time in finding the additional materials, but it would also limit students’ opportunities of improving independent learning skills resourcing their own relevant materials. However, students still had to read the resources provided in order to search for tentative solutions for the given problems.

Allen, Duch and Groh (1996) assert that learning problems should be designed in order to create interest and controversy and encourage students to raise questions. The results of the study showed that all teachers carefully designed learning problems (see
The teachers used books and newspapers to design their own learning problems, and they also collected learning problems from colleagues.

An extract from teacher interview described that:

\[(T8) I\ taught\ the\ first\ year\ students.\ \ So,\ their\ basic\ knowledge\ of\ the\ subject\ was\ rather\ limited.\ I\ mixed\ PBL\ sessions\ with\ mini\ lectures\ in\ my\ course.\ I\ prepared\ for\ my\ PBL\ implementation\ by\ designing\ mini\ lectures,\ writing\ learning\ problems\ for\ some\ parts\ of\ the\ course\ content\ and\ gathering\ additional\ readings\ for\ student’s\ independent\ learning.\]

Teacher interview one also illustrated this position:

\[(T1) I\ gathered\ some\ more\ learning\ resources\ prior\ to\ my\ implementation.\ These\ resources\ are\ from\ consultation\ from\ my\ colleagues\ of\ experienced\ lecturers,\ textbooks,\ data\ projectors\ and\ other\ visual\ aids\ (VCD,\ DVD,\ pictures).\ I\ also\ accessed\ the\ internet\ to\ look\ for\ further\ supporting\ handouts\ related\ to\ learning\ content.\ To\ prepare\ for\ the\ PBL\ implementation,\ I\ selected\ learning\ problems\ from\ books,\ newspapers,\ problems\ designed\ by\ my\ colleagues\ and\ problems\ written\ on\ my\ own.\ Moreover,\ the\ learning\ problems\ chosen\ to\ introduce\ to\ my\ PBL\ class\ were\ close\ to\ my\ students’\ interests.\ They\ were\ also\ incorporated\ in\ the\ expected\ learning\ outcomes\ of\ the\ subject\ content.\]

This demonstrated collaboration between teachers in different disciplines when implementing PBL as they designed learning situations and shared them with one another. This also confirms that PBL is a multidisciplinary approach (Meier, Hovde, & Meier, 1996; Maxwell et al., 2001).
In addition, the results of my study showed that the teacher (T2) not only gathered more resources related to the topic being taught, but she designed learning problems and tested students’ prior basic knowledge (through diagnostic test or oral test) to anticipate students’ background of prior disciplines as well. She wrote:

(T2) I researched more resources related to the topic being taught, designed learning problems and tested students’ prior basic knowledge (through diagnostic test or oral test) to anticipate students’ background of prior disciplines which would be the foundations of the subject to be taught. Moreover, I could learn students’ learning attitudes as well.

This teacher went to considerable effort to understand the students’ prior knowledge. This would have enabled her to build on the foundation of prior learning. It could also have helped her learn about students’ learning attitudes prior to PBL implementation. This teacher designed learning problems that incorporated the course content. It was an effective step in the preparation for her PBL implementation. It is interesting to note that she had learnt through a PBL approach while she was undertaking a Masters course in Australia. She also implemented this innovative approach in her university classes prior to participating in the study. This participant’s prior experience appeared to have an effective impact on the level of preparation she engaged in when implementing PBL for the study.

Dion (1996) also claims that teachers’ understanding of a PBL approach helps with preparation for their PBL classes. The results of the study showed that the teachers
engaged in much preparation prior to implementing PBL. The teachers prepared the learning facilities such as the classroom and finding available spaces for group work. They also arranged access to a data projector for group presentations to the class.

Schunk (2008) asserts that Vygotsky’s theory of social constructivism can be applied in designing instructional scaffolding. This is the process by which the teacher provides support for the learners when they are involved in learning in their Zone of Proximal Development. The results of the study showed that the teachers applied Vygotsky’ theory of social constructivism in designing scaffolding questions to support students’ learning. The preparation of scaffolding questions and the teachers’ facilitation are two important factors that encourage students to actively engage in the learning process.

The teacher (T2) further discussed the position:

(T2) I had to thoroughly research on the course content I was teaching. I read more readings related to the course content as students sometimes raised some new ideas they found in the articles I had never read before. At the same time, I designed learning problems incorporated in the course content. I tried to put myself in students’ position solving the learning problem and imagined how difficult the problem was and what learning resources I needed to gather to solve it.

According to Schmidt, Henry and de Vries (1992), PBL contrasts considerably with conventional teaching. Some learners find it difficult with self-directed learning. I argue that it is very important to provide students who are new or have little
experience of a PBL approach with understanding of the approach before they actually participate in learning through a PBL approach. In addition, Pham and Fry (2004) assert that Vietnamese students still passively study through traditional approaches like lecture-based learning. The results of the study (see Table 12 for reference) showed that the teacher participants carefully explained PBL to their students prior to the commencement of the process of PBL implementation. One teacher illustrated this position:

(T3) *I think the first class meeting is the most important of the PBL implementation. I introduced to students the teaching and learning approach. In particular, I had to clearly explain to students their new role in PBL class so that they would prepare for their learning. Specifically, I explained to students the objectives of the course, the benefits of learning through a PBL and why they had to study through a PBL in stead of traditional approaches.*

The teacher (T2) reminded students of prior taught knowledge which was seen as foundations for her course to be taught. She responded that:

(T2) *Before the first PBL class meeting, I uploaded the course syllabus on the learning website of the university. Students logged in the blackboard of the course to know what they had to prepare for learning the course. I also uploaded additional readings of the course on the blackboard.*

The teacher (T4) further discussed this idea:
(T4) I pointed out some knowledge students gained in prior subjects which could be seen as foundations for learning the new subject so that students could review what they have learned. I also introduced to students the course readings, the ways to deal with each learning issue given and discussed with students to reach an agreement on assessment criteria.

I argue that the teachers believed PBL to be new for their students. So, they prepared well prior to the PBL implementation. Teachers explained the differences between PBL and lecture-based learning and the introduction to their course and outlined the roles of teachers and students in PBL sessions as well as discussed differences in assessment styles. Moreover, it is interesting to note that some teachers guided students with some skills needed in learning through a PBL approach. My understanding is that the results of the study showed a shift in teachers’ perceptions on the need to prepare students for PBL in the first session.

According to Dion (1996), when preparing for the PBL process, a PBL facilitator has to set clear guidelines for working in groups, as group work is one of the important factors involved in learning through a PBL approach. The results of the study (see Tables 13 & 14) showed that some teachers allocated groups for group work while others allowed students to form their own groups. Group work is an important feature in PBL as it provides opportunities for students to improve a range of skills such as problem solving, team working, critical thinking and self-directed learning. It is interesting to note that four teachers (T2, 3, 7 & 8) who encouraged students to form groups by themselves were the teachers who had experience of PBL prior to
participating in the study whilst seven other teachers took responsibility to assign their students to groups. One teacher responded that:

(T3) I encouraged students to form their groups voluntarily, but there were also some group changes with the help of the class monitor. Groups of 5 students were often chosen for working with the learning problems which required a couple of class meetings to finish, with simple learning problems which could be solved right away in a single class meeting, pair work was preferable.

Another teacher who taught English literature commented:

(T6) My class was divided into 3 groups of 5 students as there were 15 students in my class of English literature. The groups were encouraged to assign work for their group members according to their own interests. In addition, there could be other ways of group formation according to the requirements of each task.

Extract from teacher interview one:

(T1) I taught English for the undergraduate students who are in their first or second year in the university course. There were about 25 to 40 students in each class. I think it seemed to be a suitable class-size for problem-based learning. I assigned students to work in groups of 5 to 6 students. In each group, I encouraged them to choose group members as a group leader who was responsible for the facilitation of group discussion, and one as a recorder who recorded the ideas of group members during
the discussions. These positions could be alternated amongst group members when the group engaged in different learning problems.

I argue that the four teachers (T2, 3, 7 & 8) who encouraged students to form their own groups had hands-on experience of PBL which gave them the confidence to allow students to form their own groups. In particular, their approach of group allocation contributed to promoting students’ independence.

In relation to the teachers who allocated groups it was possibly a reflection of the difficulty that teachers experienced in giving up control, as most teachers assigned groups. It is interesting to note that teachers (T1, 9, 10 &11) assigned students in groups with group-sizes of six to seven students. These teachers also took responsibility to appoint group leaders and setting group norms for students to discuss. My understanding is that these four teachers had difficulty handing over control to the students themselves. Their choice of group-size of six to seven students was not as suitable as a small group-size of three to four students as students would have fewer opportunities to collaborate with one another during the group work. Greater opportunities were provided by the other seven teachers for student collaboration by having groups of three to four students. The independence of students was also enhanced by encouraging them to set group norms and choose group leaders on their own. As Dion (1996) states students should be guided to work out their own groups’ norms which are seen as a consensus reached through the group’s discussions.
Regarding teachers’ facilitation during the PBL implementation, Little (2000) proposes using guidelines to support the implementation of PBL. The guidelines introduce a range of steps of the PBL implementation. The results of the study (see Table 15) showed that the teachers mostly followed guidelines in the implementation by introducing learning problems to students, helping them identify learning issues, providing any necessary additional resources, as well as supporting students in finding tentative solutions to the assigned problems.

In addition, the results of the study showed that the teacher not only helped students identify the resources needed to solve the given problems but they also provided students with learning materials. My understanding is that the provision of the necessary learning resources would benefit students in terms of time spent gathering additional resources. Students could gather their own additional materials if the timeframe allowed for this. In this way it would benefit their self-directed learning skills. However, students can save time if they are provided with a variety of core readings for the course by their teachers. I argue that the provision of necessary resources was suitable in the Vietnamese educational conditions which had limited teaching resources. It should be noted that the teachers provided students with resources only, not the answers of the problems. Students had to carefully investigate the resources provided in order to find tentative solutions to the given problems. This also promoted students’ skills of independent and self-directed learning.

Examples of teachers’ responses on the in-class facilitation:
I used problem-based learning in some lessons in the course because it is quite new with my 1st year students and some knowledge content of the course is seen not appropriate for being problem-based.

With some lessons I implemented a problem-based learning. I often assigned students to work in groups. First I presented the learning problem to the whole class to gather a range of ideas from students about the problem. Then, I guided them to find what they know about the problem and what they don’t, and they listed what they don’t know about the problem as learning issues. I encouraged the groups to choose the issues for their group investigation. At the same time, I provided them with some learning resources (books, journal articles, internet links...) to help them solve the issues chosen. I also scheduled for the group consultation as well as the class meetings. The students can also contact me via emails or telephone for further consultation on their learning issues.

Groups have been provided with learning problems for working prior to the whole class presentation. After working in groups under the supervision of the facilitator, each group was allotted appropriate time for the completion of the given problem. When the group work was due, groups were required to present what their group reached to the class whilst the tutor (or students in other groups) took notes of any unclear issues in the presentations and asked additional questions to promote further discussions… I did not have many explanations to respond to students’ presentations. I mainly encouraged other groups to pay attention to the presenting group and state their ideas what they agreed, what they did not, and raised any unclear issues for the presenting group to clarify or have further exploration.
(T4) I assigned students in groups and introduced a learning problem which included a variety of different learning problems. These problems were then selected by individual groups. After that, I encouraged the groups to divide the learning problem chosen into smaller learning issues and assigned to each member in the group. I supervised groups’ progress through regular reports submitted from group leaders as I did not have enough time to facilitate the individuals’ work. I sometimes consulted students about their problem solutions prepared in power-point slides before they were presented to the class. Moreover, I frequently asked additional questions to encourage students to clarify some unclear issues presented.

(T11) In my class of introductory Psychology, student groups actively engaged in working on their given problems. Each group member was assigned individual work by gathering additional learning resources, designing group website, taking photos to upload on the website or writing group report.

Little (2000) also mentions the importance of learners’ prior knowledge within the PBL guidelines. The results of the study showed that the teacher (T2) had tested her students’ prior basic knowledge through diagnostic and oral tests to anticipate students’ background of prior disciplines. Also, the teacher (T4) had reminded her students of knowledge gained in prior subjects. I argue that these two teachers’ ways of identifying students’ prior knowledge were quite different, but they all aimed to set foundation knowledge for their disciplines to be taught. It is interesting to note that they were amongst the teachers who had experience of PBL prior to participating in the study. This confirms the importance of teacher participants’ prior experience of
PBL in the implementation of a PBL approach. The study confirmed that prior experience of PBL enhanced some strategies within the PBL process not only building on prior knowledge but also trusting students to select their own groups, having smaller groups and trusting process assessment.

In addition, it should be noted that there are no support staff for lecture-only courses in the Vietnamese higher education system except for some courses which are divided into two separate sections of lectures and lab experiments. So, all teacher participants who implemented PBL in Social Sciences had to facilitate all student groups within their class. I argue that the teachers had to supervise their students’ group work as “floating facilitators” as Duch (2001) asserts that a “floating facilitator” works with multiple groups of learners in large classes by travelling between the groups to facilitate group work.

It is interesting to note that the teachers (T2 & 9) used a variety of facilitation approaches. They not only supported their students to find tentative solutions to the given learning problem, but they also advised their students to use different ways to present their group work results such as designing a website, brochure or performing in a play written and directed by group members. The wide variation of teachers’ facilitation approaches contributed to promoting students’ learning motivation, enhancing a range of skills and creating an effective learning environment.

The teacher (T9) responded that:
I introduced the learning problem entitled “Having sex before marriage” to my second year students at the course of Developmental Psychology. After discussions, the students divided the problem into learning issues. The groups then chose one of these issues for their group investigations. The groups gathered necessary information, analysed the learning issue chosen to find tentative solutions and then designed a website or brochure to present their solutions as advice of sex education.

According to Song, Kwan, Bian, Tai and Wu (2005), a class teacher can be an expert in his teaching field, but she or “he appeared to effectively refrain himself from lecturing or “steering” students’ direction of learning on this topic in the small group sessions” (p.383). I argue that most teacher participants had considerable years of experience in their teaching fields and they also have been familiar with teaching using traditional approaches. However, the results of the study showed that the teachers effectively facilitated their PBL classes by reducing their direct teaching and providing greater opportunities for students’ group work. In addition, I argue that teachers may have taken their facilitation too far by not giving information to students. According to Vygotsky’s ideas (1978), teachers can directly support students’ understanding within their zone of proximal development to move their understanding forward. Brown, Collins and Newman (1989) further argue that the PBL teacher is also a content and procedural resource person. In this position, when recognising the learners’ strengths and weaknesses, the PBL teacher could provide appropriate support in the form of information for students in order to help them overcome a range of learning challenges when they arise. This may prevent students from continuing down the wrong path in their process of finding tentative solutions to the assigned problems.
In addition, some examples of learning problems presented in the “Extract from interview Two” (T2) showed that the teacher carefully and effectively facilitated her PBL class. The teacher (T2) illustrated that:

An example of my facilitation: I designed a learning problem and introduced to an undergraduate class which I taught general English; they are students from Department of Agricultural Business. I required groups of students to design a brochure to advertise their department with students in other departments. To do this, students assigned their group members to gather information about their department in Vietnamese first. Then, they analysed the information and translate it into English. Also, they designed the English brochure with a computer. Before printing the brochure and giving it to students in other departments, the draft was given to the facilitator for consultation. The tutor helped students recognise any incorrect styles of writing or ungrammatical points. Students then revised their group’s brochure before printing it off. Students felt very interested in this way of learning.

Another example of learning problem when teaching a novel in the course of English Literature, I required students to read the entire novel, think about the novel and find ways to make other group members feel engaged in class discussions. Also, groups were required to design a questionnaire and invite class members to answer to see if they have similar understanding about the novel. Then groups were encouraged to write a play and attract group members to be involved as characters in the play”.
The teacher (T2) used multiple approaches in guiding her students to solve learning problems as well as supporting them in how to present their tentative solutions to the problems to the class. I argue that the teacher’s facilitation was useful in helping her students understand the subject content, develop a range of skills such as team-working and create an interesting learning environment through PBL class.

In addition, the teacher (T2) seemed to be very effectively facilitating her PBL class. It is interesting to note that she had had opportunities to learn through a PBL approach when undertaking her postgraduate course and implemented the approach in her prior university classes. Therefore, she expressed such a rich experience in designing PBL for her class. I argue that the richer experience of PBL the teacher has, the more opportunities the teacher is likely to be successful in PBL implementation.

The results of the study (see Tables 16 & 17) showed that all teachers provided facilitation for their students out of PBL class. It is a new form of interaction between teachers and students as Vietnamese university teachers are often too busy to use the modes of email or telephone to facilitate students’ learning out of class. One teacher responded that:

(T2) *I often contacted students via email or telephone to see the progress of student groups. For example, if group A presentation is due this week, I will contact the group to see if they have finished their assigned problem and guide them to focus on the important points of the presentation or provide students with additional learning resources for further investigations…. With the unclear issues presented in the presentation, I uploaded on the learning forum and encouraged students to*
participate in the forum to reply to these issues. Also, I uploaded some reflective questions in the forum and required students to write their reflections.

The teacher participants who facilitated their student learning via email and telephone showed their commitment to the PBL implementation as most Vietnamese university teachers often have a heavy workload, but their salary is pretty low. Therefore, they sometimes have to overwork such as teaching more than thirty hours a week or take on a second job to earn their living. This is one of the reasons why they may not be able to devote much of their time to facilitating their students out of class.

When implementing PBL, the teacher has to make changes to the ways they carry out instruction, planning, learning direction, knowledge facilitation and assessment processes (Torp & Sage, 1998; Gordon, Rogers & Comfort, 2001; Maxwell, Bellisimo, & Mergendoller, 2001). These educational changes can be challenging as a real change may experience with “the situation of being at sea, of being lost, of confronting more information than you can handle” (Schon, 1971, p.12). I argue that the teacher participants changed their traditional teaching to an innovative one when implementing a PBL approach in their classes, even though they probably experienced considerable challenges related to their traditional teaching, limited facilities and lack of support staff or little prior hands-on experience of PBL.

Gallagher (1997) asserts that assessment used in PBL should be authentic. It is interesting to note that the assessment used by the teachers in this study to assess their PBL students’ performance was composed of two separate parts: in-process assessment and final assessment (see Tables 18 & 19 for reference). PBL practitioners
often base assessment on different criteria throughout the learning process to assess their students’ performance as Allen, Duch and Groh (1996) argue PBL students can be assessed by their group members using a numerical scale based on “attendance, preparation for class, listening and communication skills, ability to bring new and relevant information to the group, and ability to support and improve the functioning of the group as a whole” (p.49). However, in addition to these in-process assessment approaches, the teacher participants in the study applied heavy weighting on a final assessment or test.

In addition, Toulmin (1972) asserts that the assessment used in PBL is more process-oriented whilst traditional educators often use product-oriented techniques to assess their students’ learning. The results of the study showed that all teachers applied a final assessment in their PBL classes. One teacher responded that:

(T2) At the end of the course, students were required to sit for a written test which was designed as open-book/open-question examination. This final test accounted for 70 percent of the total of assessment.

My understanding is that most teacher participants have been accustomed to teaching using traditional approaches. Therefore, they are familiar with using their traditional styles of assessment and found it difficult to trust the in-process assessment entirely.

It should be noted that an assessment style widely used in Vietnamese higher education is the written test which is often applied at the end of each course and accounts for 100% of the course assessment. In addition, assessment styles are often
prescribed in the national/university assessment policy and teachers have to follow the ones prescribed for their disciplines. There has been an introduction of multiple-choice test to Vietnam education in recent years, but it has not been popular because this new style of assessment is deemed to be limited in assessing students’ writing skills. Also, Vietnamese teachers have been encouraged to weight their assessment of mid-term test 30% - 40% and final test 70% - 60% of the total course assessment. However, although there are two separate tests, the assessment criteria are still mainly based on students’ written tests. This background information on assessment in Higher Education in Vietnam would probably account for the reasons why eight of eleven teacher participants used the final written test to assess their students’ performance.

It is interesting to note that only one teacher (T9) based the final results of the group presentation and feedback from the group to determine the final assessment of her students. This assessment was similar to what is used in the PBL approach. My understanding is that this teacher probably wanted to trial this PBL assessment approach in her course. Another teacher (T11) applied a multiple-choice test as the final assessment. This teacher advised that this assessment been introduced to his discipline division for several years therefore he did not use a new assessment style. Teacher (T4) used an oral test as a final assessment. It is noted that this teacher implemented PBL in her short training course of Industry Administration. Students undertook this course to refresh their professional knowledge when they had finished their university study a long time ago. The teacher probably found the oral test best suitable for her short training class or possibly did not trust the in-process assessment that would be suitable to accompany her PBL teaching.
Tchudi and Lafer (1996) claim that conventional assessment is a game that asks learners to guess what the teacher wants rather than perform the best they can. The results of the study showed that all teachers with the exception of one applied traditional assessment in their PBL classes. It probably allowed students to show their personal skills in completing an individual written test, but was limited in showing students’ understandings. It also did not provide the opportunity to demonstrate their abilities to work in a group, work independently, work collaboratively, interact with their peers in group work activities, resource suitable materials to solve problems and report their findings.

The results of the study also showed that when in-process assessment was used it was mainly based on the group product such as the result of the group presentation. The final assessment was only based on the individual product or specifically on the result of the individuals’ final test. In addition, the in-process assessment only accounted for a small percentage of the final result (30% - 40%) while the individual final test accounted for a much larger percentage (70% - 60%) of the total course assessment. I argue that the assessment used in the PBL classes would not encourage students to contribute well to their group work as they had to prepare for their individual final test which accounted for a greater percentage of the course assessment. This may have limited students in terms of their engagement in all aspects of the PBL process. One student had also raised concerns over how “tentative solutions” were not helpful for preparing for final exams. This highlights the mismatch between the new teaching focus and old assessment focus.
However, it is interesting to note that all teachers (see Table 19) based their in-process assessment on a variety of criteria such as class attendance, regularly submitted group reports, self-assessment, group assessment or the result of group presentation. These assessment processes took the place of a single mid-term written test which is currently used in Vietnamese higher education.

In particular, two teachers (T2, 3) applied a range of criteria in their in-process assessment. The two teachers had previous PBL experience through undertaking their postgraduate course in Australia and the Netherlands. They both had also implemented PBL in their university classes prior to participating in the study.

The teacher who used some additional criteria in the in-process assessment commented in the questionnaire:

(T2) My in-process assessment was based on:

- Students’ learning attitude (How active students are in PBL sessions)
- Group work/ pair work participation in the problem/activity
- Group presentation of the tentative solutions of the assigned problem
- Student participation in the learning forum.

In addition, the results of the study also showed that seven teachers based their assessment on criteria such as self-assessment, group assessment and the result of group presentation to decide their students’ in-process assessment. My understanding is that these criteria were not too challenging for most teachers as the teachers could provide the designed assessment forms for students to self-assess their performance,
and assess the group work. It is interesting to note that the in-process assessment of two teachers (T10, 11) was determined by the group presentation only. These two teachers had the least teaching experience. Therefore, they probably decided they could handle one assessment process described as suitable for PBL.

Regarding the assessment used in the PBL implementation, I argue that all teachers implemented their in-process assessment based on some of the criteria deemed to be suitable for the PBL process. Moreover, it is interesting to note the importance of teachers’ prior experience of PBL. I argue that teachers’ experience of PBL prior to participating in the study helped them in preparing for PBL class, setting the problem, building on prior knowledge, facilitating student learning as well as using a wide range of in process assessment strategies. It also influenced the attention given to a range of group and self assessment strategies compared with less experienced colleagues.

5.2. The second aim of the study: To understand the benefits and challenges of implementing a PBL approach from the perspectives of the university lecturers

Allen, Duch and Groh (1996) assert that learning problems should have diverse solutions which encourage students to investigate different aspects of these tentative solutions based on their prior knowledge and new learning. The problems are designed in order to provide students with opportunities to explore diverse solutions and prevent them from believing that they have reached a “perfect” solution.
The results of this study showed that designing problems was seen to be the most important part in the process of PBL preparation by eight teachers (see Table 21). These teachers embedded both the learning outcomes and student interests into the problem. Although writing PBL problems is time-consuming and it requires the teacher to base the problem on many criteria in the writing process in order to design effective problems (Allen, Duch and Groh, 1996), the teachers in this study decided to spend time on this process. In this study the questions were given to the students. Attention was paid to following students’ interests, and at the same time embedding the learning outcomes into the problems.

Example of teacher responses:

(T2) It is important to design learning problems which are exciting and related to the subject learning outcomes. It is also necessary to prepare good ways to attract students to actively participate in the process of solving the problem given.

Vernon and Blake (1993) assert that the PBL facilitator’s role becomes one of resource guide and the task and group consultant. However, teachers should only use their understanding of resources to guide group processing of information not to impart information to students. It is interesting to note that three teachers (T1, 10, 11) believed that having vast resources for students’ self study and a deep understanding of the subject content was the most important in their PBL preparation.

One teacher illustrated this position:
(T10) Tutors should know what students’ learning styles are and tutors have a broad and deep understanding of the subject content they are teaching. Moreover, tutors should provide students with a range of learning materials for their self-study.

I argue that the provision of resources for students was an effective step for PBL preparation. Also, teachers’ understanding of the subject content is also useful in keeping students on the right learning track. However, it is necessary to prepare a range of effective learning problems which trigger students’ learning and then encourage them to actively gather additional resources to solve the assigned problems. It is noted that the three teachers (T1, 10,11) were the ones who had the least number of years teaching experience and no PBL background prior to participating in the study. Therefore, they may not have recognised the importance of the problem design itself in enabling other important processes such as self-directed learning, collaboration and selection of resources to take place.

The results of the study showed that most teachers decided the PBL teacher’s role as facilitator to be the most important part during the process of PBL implementation in class (see Table 22). Brown, Collins and Newman (1989) argue that the PBL teacher becomes a content and procedural resource person, a facilitator of group processes, a guide to additional resources, and a learner themselves. Instead of being the “sage on the stage” as often seen in traditional classes, the PBL teacher is now working as facilitator who models different ways of problem-solving. It is interesting to note that these teachers who have been familiar with traditional teaching carefully described their new role as a PBL facilitator. In addition, their descriptions of a helpful
facilitator’s role were different from the role they would take when using traditional teaching approaches.

Examples of teacher responses:

(T2) *The tutors should be flexible, active in facilitating student learning such as introducing problems, commenting on students’ work, assessing students’ tentative solutions of the given problems, and giving constructive feedbacks in time to motivate students.*

(T4) *The most important part in PBL implementation is the role of the tutor, the PBL teacher should:*

- Love their teaching career.
- Have a deep understanding of the subject content.
- Have basic knowledge of other subjects related to the subject content they are teaching.
- Be ready for student consultation.
- Be ready for dealing with group conflicts.

An example of teacher response in considering students’ role playing as the most important part in the PBL implementation in class:

(T6) *The important part is the role of the learners as they are expected to have good background knowledge so that they can develop a variety of tentative solutions from*
problems provided as critical ways of solving problem are highly assessed in PBL class, not just the subject content gained.

I argue that the teachers were very interested in implementing PBL as they showed their willingness to change their traditional teacher-centred role to a new position in PBL which was likely to be more challenging and demanding. The teachers’ role change was necessary in PBL class and it occurred even though it was not easy for teachers who had been familiar with teaching using traditional methods, having not experienced this different approach personally (Novak, 1990, Albion & Gibson, 2000).

It is interesting to note that the teachers showed willingness for student consultation during the PBL implementation. I argue that this is a new approach for the teachers. It is not easy for a traditional teacher to give up his/her control in class as there has been a teacher claimed that “I can’t handle this. I want to be in total control and problem-based learning doesn’t allow that” (Boud & Feletti, 1991, p.32). In addition, Khoo (2000) asserts that teachers in Eastern cultures can be seen as authoritarians who expect their learners to be quiet and obedient in the classroom. This could prevent students from being dynamic in the class. However, the results of this study showed that the teachers tried to facilitate student learning as they wanted to create opportunities to promote students’ skills of independent learning and self-directed learning. They also claimed that their habitual traditional teaching sometimes makes them eager to intervene in student discussions to provide answers. My understanding is that the teachers had to struggle to steer their accustomed role as “a sage on the
stage” towards an innovative one as “a guide on the side” during the process of the implementation of a PBL approach.

The teacher (T10) illustrated this position:
not fully understand the PBL facilitator’s role in the way that other nine teachers did. The results of the study confirmed that these two teachers were the ones who had the least teaching experience and no knowledge of PBL prior to participating in the study. Therefore, they were not able to describe their role as facilitator during the process of implementing a PBL approach.

The results of the study showed that all the teachers described the following positive features gained from PBL implementation (see Table 23). My understanding is that the teachers recognised a range of positive aspects which aimed to enhance students’ learning such as collaboration in the learning environment. These positive learning aspects contributed to helping students achieve learning outcomes of knowledge content as well as the skills required for working with others, and being self-directed in their learning. Barrows and Tamblyn (1980) argue that learning through a PBL approach helps students with improving a range of skills in problem solving, critical thinking, team working and self directing. One teacher described that:

(T1) I think positive aspects in the process of PBL implementation are:
- Learners are eager to learn something new. They have opportunities to work collaboratively to reach a consensus during their group discussion.
- Students have opportunities to be educated to become active learners.
- When working through the problem-based learning approach, students can gain an understanding of subject content and develop a range of skills in problem-solving, self-directed learning, critical thinking, leadership, teamwork.

The teacher (T4) further discussed:
As students become more active in their learning, they gradually enhance their skills in teamwork, public speaking and know how to apply both theoretical and practical knowledge in speculating the chosen learning problem. This makes the learning environment more interesting. Moreover, it also encourages the tutors to have better preparations before class.

Another teacher commented:

(T6) Studying through PBL approach, students become active, self-directive and have many interesting/surprising ideas in class discussions. Every student has equal opportunity for their individual contribution to the group. So, the learning environment becomes more interesting because lots of opinions were raised. Furthermore, the tutors have opportunities to have a better understanding of their students who are passive/silent/slow learners to provide them with appropriate support.

In addition, teaching using PBL could have helped the teachers identify their students’ learning abilities. It is interesting to note that during the teaching process through PBL the teachers were able to recognise students who were fast, slow or reluctant learners. In this way, teachers can recognise students’ strengths or weaknesses in order to generate appropriate support. Savin-Baden and Major (2004) assert that the humanist theories of Maslow (1968) show a hierarchy of needs which lend support for the process of PBL implementation. Teachers’ timely constructive comments and support probably helped students improve their learning at the time. In comparison with
traditional learning, students only receive learning feedback in their final-only test result. This single test is often conducted at the end of the course, and it is too late for students to adjust their learning approach.

On the negative side of implementing a PBL approach to teaching, all teachers in the study claimed that PBL implementation was time-consuming. It is also the issue raised by other PBL practitioners such as Bayard (1994) who argues that students spend more time outside of class gathering additional learning resources to solve the assigned learning problems. Also, it is time consuming when students have to examine a range of tentative solutions using the so-called conditions of “trial and error”. Bligh (1995) further states that PBL implementation is time-consuming. Student-talking time is required which is time consuming and may result in the teachers abandoning the idea.

Examples of teacher responses:

(T10) Some students complained that it was difficult for them to take notes what other groups were presenting as these presentations were pretty long and seemed not to be followed systematically. Students also claimed that they did not know what was seen to be important points to be written down. Also, each lesson was often divided into different learning issues which were designed as problems. These problems were then assigned to individual groups. For this reason, students in one group were able to understand the learning issue of their own group only. They might not be clear about other learning issues solved by other groups as they were presented in a short period of presentation.
I find it difficult to incorporate students’ interests into the course/lesson’s expected outcomes. Some students just kept talking about what they were interested in and ignored other important points of the lesson although their presentation preparation had been debriefed by the facilitator.

It is time-consuming. To be successful in the implementation of a PBL approach, both tutor and students have to work actively in class besides the tutor’s thorough preparation.

Extract from the teacher interview two:

(T2) I found some negative aspects in the implementation of problem-based learning approach:

- Time-consuming

- It is quite difficult to implement problem-based learning in large class (over 50 students) like lecture-based approach.

- The implementation of a PBL approach need more teaching staff to work as facilitators.

Fullan (2007) asserts that a teacher can implement an innovative approach in teaching an old curriculum to explore his/her students’ perceptions in learning through the approach. In this study, the teacher participants implemented a PBL approach in teaching their old course curricula. It should be noted that time allocation was set for teaching using traditional approaches. In addition, Prince and Felder (2007) assert that “Problem-based learning is arguably the most difficult to implement of all the
inductive teaching methods. It is time-consuming to construct authentic open-ended problems whose solution requires the full range of skills specified in the instructor’s learning objectives” (p.16).

The results of the study also showed that it was challenging for the teachers to work with students who had limited knowledge. The prior knowledge of students is the basis on which students build their understanding of new issues. As Vygotsky (1978) asserts students work within their Zone of Proximal Development (ZPD), and their learning moves to the next level through additional support from the class teacher, or more knowledgeable peers. Therefore, this explains why the teachers faced difficulties facilitating student learning when they may have had a limited level of prior knowledge from which to move forward in their thinking.

The results of the study highlighted the challenges faced by teachers when they worked as a single “floating facilitator’ for all student groups. As discussed previously, there were no staff to support teachers in facilitating their group work. Therefore, the teachers had to handle all the students in their PBL classes. The teacher (T3) responded that:

(T3) It is difficult for a single teacher to facilitate a large class of over 40 students. In this way, it is quite challenging for the tutor to supervise and assess students’ performance equally for all group members. Students’ limited knowledge taught in their prior class is also a challenge for the implementation of PBL. Also, limited teaching aids provided such as discussion spaces, A0-papers and data projectors are other challenges in the implementation of a PBL approach.
The teacher (T3) found it difficult to facilitate a class of over 40 students, especially in supervising student learning as well as fairly assessing student performance. It is interesting to note that this teacher was the one who had a PhD and prior teaching experience of a PBL approach, but he also met challenges with facilitating a large class when implementing PBL. I would recommend that if there is no additional support from tutorial staff, the teacher should be assigned to facilitate a small class which is not more than 40 students in order to use the approach successfully.

Another challenge the teachers faced during the implementation of a PBL approach was how to assess their students’ learning performance fairly. My understanding is that new assessment styles such as self or peer assessment were new to the teachers who have been familiar with traditional assessment. An extract from teacher interview (T2) claims: *it is quite difficult to manage the group work because the tutor sometimes does not recognise the lazy students in the group to assess group members’ work fairly.*

The results of the study showed that the teachers claimed to have seen the biggest difference between teaching through a PBL approach and other traditional approaches as in the role of the teacher (see Table 25). It is interesting to see that the biggest difference between PBL and other traditional approaches noted by seven teachers (T1, 2, 3, 4, 7, 8 and 9) was the new role of the teacher and assessment styles used in the PBL implementation. I argue that a PBL teacher has to make a real change of their role as an effective facilitator first in order to steer their students towards learning using a PBL approach.
Examples of teacher responses:

(T1) I have been taught through conventional methods as well as problem-based learning approach when I was an education student, and have been applying these approaches in teaching my undergraduate students since my university graduation. I found that, with problem-based learning, I have to do more preparations for the problem-based learning class than that in lecture-based class.

In problem-based learning, I have to design the learning problems, seek more supporting learning resources to provide for student investigation and facilitate students’ group discussion besides the so-called usual work of designing lesson plan which is seen as the teachers’ major preparation in teaching used lecture-based approach.

Problem-based learning implementation is seen to be more time-consuming in comparison with lecture-based application. However, I have got lots of positive feedbacks from my students after they have been taught through a problem-based learning approach. From my observations, problem-based learning learners are more active than their lecture-based learning counterparts.

(T4) PBL tutors do not just deliver the designed lessons as their colleagues do in traditional classes, but they are ready to make changes which are applicable to the circumstances of their classes.
With PBL approach, the tutor is working as the organiser, guider in order to encourage students to be the centre role of their learning. Through the learning, students can gain not only the subject content but a variety of skills which are useful for their present learning and future career as well.

It is interesting to note that five of these seven teachers (T1, 2, 3, 4, 7, 8, 9) were those who had implemented PBL prior to participating in the study (T2, 3, 4, 7, 8, see Table 3). The teacher (T9) had a PhD and rich teaching experience and although the teacher (T1) had the least teaching experience, he used to be T2’s student and had learnt through a PBL in T2’s university class. Therefore, I argue that the teachers’ experience of PBL prior to participating in the study played an important role in helping them recognise the biggest difference between teaching through PBL and other traditional methods. This also probably contributed to enhancing the teachers in their facilitative role because of their clear understanding of the processes when implementing PBL.

In comparison with other teachers, the teachers (T5, 6) believed that the biggest difference between teaching through PBL and other traditional methods was a range of group activities created to promote students’ learning skills. This contrasts with little or no group work when teaching using traditional methods. The creation of a range of group activities is one of the new duties of teachers when implementing a PBL approach.

Two teachers (T10, 11) claimed that the biggest difference in learning through a PBL approach related to students’ taking responsibility for their own learning. In PBL
classes teachers created a range of independent learning activities to engage students in.

I argue that the differences noted by four teachers (T5, 6, 10, 11) are not contradictory to the one discussed by the other seven teachers - “the new role of the teacher”. In particular, these differences which are mainly seen in students’ learning process have initially been triggered by a range of role changes of the class teacher – facilitator. Therefore, traditional teaching approach can be transformed into an innovative one in order to steer students’ traditional learning towards self directed learning which values the skills acquired through group work and self-directed learning.

It is interesting to note that all teachers considered PBL a worthwhile teaching approach. I argue that the teachers were interested in implementing an innovative approach like PBL in their teaching in order to contribute to the improvement of Vietnamese tertiary education. Pham and Fry (2004) assert that this higher education expansion aims to create skilled employees for the changing economy in Vietnam. In addition, I argue that the teachers grasped the benefits of PBL for students’ learning in comparison with learning through other traditional methods and they all asserted that PBL would be their first choice in selecting teaching approaches for their future university classes. It is interesting to note that the teacher (T3) confidently illustrated in the interview:

I think it is an important approach in education nowadays as working through the approach students can not only achieve their knowledge content but they also enhance other skills which are seen to be very important for the present working
environment. I would like to say that using problem-based learning approach in teaching helps the graduates meet the demand of the working environment which is more and more professional.

5.3. The third aim of the study: To discover the effects of the implementation of a PBL approach in supporting the learning of 182 university students in Vietnam from the perspectives of the students

There was an excellent response (98%) from student participants of 11 classes. This showed a strong commitment on students’ part in engaging in classes where PBL was implemented. There were several possible reasons for this effective response. Students were interested in learning through a new approach like PBL as they had been taught using traditional methods for many years. In particular, they may have been bored with passively listening to their teachers’ lectures for many years (Pham & Fry 2004). I argue that the introduction of a PBL approach in these classes possibly brought an exciting atmosphere for students’ learning to the environment. They were willing to complete the questionnaire to share their perceptions of learning through the PBL approach.

More than half of students had experienced PBL prior to their involvement in the study (see Table 29 for reference). Many students would have learnt through PBL with teachers prior to participating in the study. As it noted that five of eleven teachers had implemented a PBL approach in their teaching before they participated in the study. It is interesting to note that PBL was also introduced in Vietnamese high schools as some first year students in four classes (C1, 8, 10, 11) responded that they
had been taught through a PBL approach prior to participating in the study or the
students may have just learnt through a PBL approach in the semester 1 of their first
year.

One student from C2 responded that:

*I have learned through a PBL approach in my prior English classes of Reading
comprehension, Grammar and British Literature.*

Another student from C5 commented in the questionnaire:

*I had opportunities to learn through PBL since my first year in the undergraduate
course. At first, my classmates and I felt confused as we were not familiar with this
innovative approach, but then we were accustomed to it and found that we had a
better understanding of lessons when learning through this approach.*

Students’ prior experience of PBL may have been beneficial for their learning when
they participated in a PBL approach in the study. In particular, students had to
collaboratively work to search for tentative solutions to their groups’ given problems.
This may be challenging for the PBL implementation if group members have no or
limited prior experience of team work skills. Therefore, I argue that the presence of
the students who had prior experience of PBL was advantageous for students’ group
work in the study. They may have applied their group work skills achieved in
organising and facilitating their group collaboration during the learning process as
Allen, Duch, & Groh, (1996) assert that the group work helps develop learning
communities in which students feel comfortable expressing new ideas and raising new questions about the learning issue. One first year student interviewee (S8) responded that:

As I have known, PBL is an innovative teaching approach which begins with the introduction of learning problems of the tutor; the learners then work independently in small groups to solve the given problems. The tutor will provide learners with help if any difficulties happen in the group work process.

Students who had had opportunities to learn through a PBL approach prior to participating in the study had a considerable understanding of the approach and had gained a variety of working skills in learning through PBL. A third year student (S2) responded:

I have learnt through a PBL approach since my first and second years. It is an interesting and innovative learning approach which helps students gain a variety of working skills, not just the subject content as in traditional lecture-based learning method.

Extracts from student interview:

S6: Learning through PBL since first year in some subject, PBL helps me enhance learning and working skills besides the subject content. It is different from what I gained in learning through a lecture-based method in my prior class.
I have actually learnt about problem-based learning. I have learnt it through the subjects such as theories of teaching and learning and methods of Education teaching. In my opinion, it is the approach which encourages students to solve the learning problems independently in support of the tutor.

In the process of solving the problem, the learners’ independent learning is highly promoted whereas the tutor’s guidance or help is only provided when requested. I think, some innovative methods used in my seminars in learning the subjects like political economics and methods of Education teaching are seen as problem-based learning.

PBL is one of innovative teaching and learning approaches which enhance students’ self-directedness and creativity. In a PBL class, the tutor introduces students learning problems which are ill-structured and attracts students to engage in solving the problems. At the same time, the tutor facilitates and guides students to investigate the given problems independently. Through PBL, students can develop their problem solving, thinking and working skills.

It is interesting to note that the results of the students’ perceptions on the teacher preparation for PBL classes match those of teachers’ perceptions in the explanation of roles, advantages and differences between PBL and other approaches. I argue that there were several reasons for this similar perception.

The teachers effectively prepared their students prior to undertaking classes where a PBL approach was implemented. The teachers explained to students the differences between learning through traditional methods and the innovative approach like PBL.
which may be challenging for learners who are new to the approach. In particular, the
teachers introduced the role change of teachers and students in PBL learning which
helped students effectively recognise their new role in independent learning. For
example, a student from C2 commented: *Prior to the implementation, the teacher
guided us in some steps to successfully learn through a PBL approach.*

It is interesting to note that the teachers had not commented on assigning students to
groups according to ability whereas students were very aware of this grouping (see
Table 31). These teachers may have taught these students previously and known the
students’ abilities. Six teachers allocated students to groups (T1, 5, 6, 9, 10 and 11).
However, I argue that it would have been more effective for students to select their
own groups. In this way students would not have been stigmatised being locked into
an expected level of achievement. Also, friendship groups would promote effective
collaboration and sharing of ideas. Brimble and Davis (2005) assert that using group
work in PBL creates opportunities for learners to collaborate with each other, learn
from one another and build on knowledge obtained from the learning interactions.

Examples of student responses:

(C2) *The teacher encouraged us to choose group members by ourselves. Also, the
teacher advised us to select the learning issue for the group on our own.*

(C3) *The teacher assigned us in groups of 4 and mixed students of different levels in
a group. This aimed at encouraging students to help one another in the group work.*
Students in classes (C2, 3, 7 and 8) were advantaged in improving their self-directed and independent learning because teachers allowed them to form groups themselves. It is interesting to note that these teachers all had experience of PBL prior to participating in the study. They may have known that students would have opportunities to enhance their independent learning through the process of forming their own groups.

I argue that there were, in each class, several students who had prior experience of PBL, and it would have been more effective if the teachers had provided students who were new to the approach with some group work training. According to Cohen (1994), group work is not always effective without the teacher’s facilitation as group peers may not have been trained in group work skills. However, it is clear that half the student participants had prior experience of PBL which they could bring to their groups.

Students were likely to effectively organise the group work in their individual groups. In particular, they knew to divide their group’s learning problem into different small learning issues which were then assigned to each individual member. This could be limiting compared with the opportunities to work together that would arise when all students study the same issues.

Examples of student responses on the organisation of the group work:

(C5) *At first, the group had a discussion to decide what were the learning issues of the chosen problem and anticipate any directions the problem may be developed.*
Each group member was assigned to find resources to solve individual learning issues which were then synthesised to be a completely solved problem.

(C11) The group nominated a member as the leader who was responsible for assigning learning to individuals, managing the group work and motivating group members. After that, the group scheduled the group meetings for further group discussion. Finally, the group synthesised all the learning issues to become a complete problem with its tentative solutions.

It is interesting to note that the group work in 4 classes (C2, 3, 7 and 8) was mainly supervised by group leaders including assigning learning issues to group members, managing group discussions and contacting facilitators when necessary. The teachers of these classes were those who had experience of PBL prior to participating in the study. They have learnt the importance of promoting students’ active role during the learning process using PBL in order to help students improve their independent learning skills. According to Bridges and Hallinger (1991), the amount of teacher direct instruction is reduced and learners take greater responsibility for their own learning in PBL. Vernon and Blake (1993) further assert that the teacher’s role becomes one of resource guide and group consultant. This role change promotes group processing of information rather than an imparting of information by the teacher. Students illustrated this position:

(S3) In the group, we divided the problem given into tasks and assigned each group member to appropriate task. Group members then gathered additional learning
resources to solve the given task. In the scheduled group meetings, we reported to the
group the progress of the given task and any difficulties arisen.

Following the schedule of the group meeting, group members presented their tentative
solutions of the assigned tasks to the group as well as had further discussion with the
whole group to synthesise different individual tasks to become a complete problem.

(S7) Each group has three members chosen randomly. A group leader and a recorder
were chosen. The leader made group working plans and facilitated group discussions.
Then, the group chose a learning problem amongst the ones raised by the tutor for the
group. The group first discussed things they were going to do to solve the problem
chosen. Then, each group member chose their own learning issues divided from the
problem according to individual ability. Additional group work were the finding more
learning resources, interviewing academics, designing the web, writing group
presentations or designing group publications such as CD, VCD.... Group meetings
were scheduled at least once a week according to the progress of the group. Three
days before the group presentation to the class, last group meeting was held to have
final discussion on what and how the group could present to the class. In addition,
each group member was required to prepare their own work as well as to comment on
the others’ work.

(S9) At first, a group leader and a recorder were chosen. The leader should be a
person who can:

- Encourage group members to participate in the discussion
- Suggest some strategies for solving the problems given
- Give an agenda for the group work
Then, based on the agenda, the group members worked on the issues listed in the agenda, the group worked to have a consensus in each issue before moving to the next one. The recorder had to record the agreements of the group for the class presentation. At the end of each group meeting, the recorder read aloud the agreed issues for double-checking.

It is interesting to note that learning through a PBL approach enhanced students’ collaboration to find solutions for their assigned learning problems. Students (see Table 32) were responsible for solving their own learning issues. Students had opportunities to engage in group discussions as well as present their own findings to the group. These skills help learners in problem-solving, independent and self-directed learning. According to Gallagher (1997) and Reynolds (1997), students should have opportunities to identify their learning needs, help plan classes, lead class discussions, and assess their own work and that of their peers while learning through a PBL approach. One student (from C6) responded:

_When being assigned a learning problem by the teacher, I discussed with the group members to divide the problem into different learning issues. We then chose each issue and searched for necessary resources to solve it. During the process of solving the chosen issue, we helped each other by introducing additional learning resources found or provided comments for group members’ own work._

Students had opportunities not only to improve learning skills through collaboration but to build on their responsibilities as well. I argue from the data that students had to respect one another in the group work by attentively listening to their peers’
presentation and giving constructive comments and vice versa. In addition, students respectfully collaborated with their peers instead of competing to find tentative solutions to the learning problem. It was through the group work in PBL, students learnt to interact ethically and therefore they gradually developed their collaborative skills.

One student (from C 11) illustrated that:

*I consulted with other group members, listened to their opinions, compared and synthesised the opinions. I also defended my ideas to have further discussions in order reach an agreement.*

From the analysis of data on group work, the PBL approach encouraged students’ self-directed and independent learning skills through collaboration. In particular, it appeared that students actively engaged in group discussions, finding additional resources, working on their assigned learning issue, or attending class meetings and presentations. These learning activities were vastly different from those seen in learning using traditional methods.

Examples of student interview responses:

(S1) *First the teacher assigned students in groups of 5 and also explained to us how to work in group. Then, the teacher introduced learning problems to, divided them into small learning issues and provided some learning resources groups for group investigations. After that, the group assigned work to group members and set time for*
individuals’ independent work. The group members were encouraged to gather additional learning materials to solve the assigned learning issue. Group members had to report to the group the progress of their given issue. Finally, the group gathered all learning issues, analysed and synthesised them to form a complete problem together with its tentative solutions before presenting to the class.

(S2) We divided the problems given into tasks and assigned group members to appropriate tasks. Group members were encouraged to gather additional learning resources from internet to solve the assigned task.

At the group meetings, group members had to report to the group the progress of their given task, any challenges and if they needed any help for further research. Group members brought their individual completed task to the group when the last meeting was due to. Here, individual tasks were reported and synthesized to be a completely solved problem.

(S7) Prior to the group work, we sought for consultation from other class members to gather supporting resources. During the group work process, we asked for help from other members in designing the web, the publications, and providing them with more relevant learning resources.

In reply to their help, our group willingly provided help for other groups, especially in introducing them additional learning materials.
It is interesting to note that the PBL approach also enhanced student collaboration out of class sessions. There were several reasons for this enhanced collaboration. The teachers may have allocated time and provided appropriate resources to support student learning. In addition, students themselves may have identified the need for collaboration out of PBL session as the class discussion time allocated may not have been sufficient.

PBL encouraged students to use a range of communication styles in out-of-class. Students participated in online learning discussion boards besides meeting face-to-face or contacting via email and telephone. The online forum facilitation was seen to be a very new approach in Vietnamese education which has mainly been teaching using traditional methods. It is interesting to note that students were aware of this new learning interaction, but the teachers did not comment on it. Teachers and students were provided with the online facilities by the university to support teaching and learning. However, few students participated in the online learning forums as the teachers may not have been familiar with using online facilitation or the duration of the course may not have been long enough for implementing a wide range of different communication methods.

Student from C2 responded that:

_I met my group peers out of PBL session to discuss and develop the learning issues assigned. As we had more time, we discussed the problem in details; each member presented strategies to solve his/her own assigned task as well as supporting resources and the group gave comments and advice._
Another student from C2 wrote:

*Out of PBL class, I met my group members to ask them about learning resources I could find to solve my problem or I had them comment on some resources I searched. Moreover, I also introduced them some resources which might be useful for solving their assigned learning issues.*

Extracts from student interview:

(S1) *As group members were all assigned our own tasks, so I just tried to complete the task on my own and sometimes asked for help from other peers.*

(S8) *Each group presented the solutions of their assigned problem to the group while other groups were required to carefully pay close attention to the presentations and ask further questions for clarifications.*

(S11) *Occasionally, I sometimes asked for clarifications of my assigned learning issue when needed.*

The PBL approach certainly promoted student collaboration, negotiation and peer support when arriving at tentative solutions. All students had opportunities to extensively discuss the learning issues in order to reach agreements on tentative solutions to the problem. Students additionally gave persuasive explanations to those who still wished to defend their possible solutions.
Students illustrated this position that:

(C2) Sometimes, there were some different ideas raised during the group work. To reach an agreement in group discussion before class presentation, our group selected tentative solutions or strategies which were agreed by a large number of group members.

(C5) In my group discussions, a range of personal ideas were raised by group members. We discussed all ideas raised and determined which solutions were seen to be possible for the assigned problem.

The PBL approach clearly encouraged students to actively collect additional resources in order to determine tentative solutions to the given problem. The results of the study showed that students appeared to be set up well with learning resources initially as well as suggestions of where to access additional resources. Teachers had further supported students by offering their personal libraries if requested. According to Nandi, Chan, Chan, Chan and Chan (2000), students accessed journals and online databases more often in gathering additional resources for solving problems during the learning process of PBL. One student (from C5) responded that: Most of the necessary materials suggested by the teacher for the group investigations were searched from the university library. We sometimes collected some more materials for further investigation of the group. However, it is interesting to note that one student (from C2) commented that: We were not provided with adequate learning resources. We had to gather additional materials from the library, internet and friends. It was
difficult for us to decide which resources were useful for solving our group’s problem as we collected vast learning materials from different resources. This student had not felt that sufficient resources were provided. It is noted that C2 were taught English Literature by T2 who had experience of PBL prior to participating in the study. I argue that it could be T2’s intention to not provide students with all the necessary learning resources as she may have wished to encourage students to independently gather further resources to determine tentative solutions to the assigned problem. In particular, when the students could not access additional materials from other sources, she then provided students with extra learning resources from her personal library for students’ investigation. This gradually helped students improve a range of skills of independent and self-directed learning. A major role in self-directed learning is being able to source the relevant and up to date information independently.

The teachers provided learning resources to support for students’ self-directed learning. The students also responded that their teachers allocated time as well as available classrooms for groups’ out-of-class meetings. It is interesting to note that the teachers rarely became involved in students’ learning activities while groups were working and only provided consultations if requested. What the teachers did was to encourage students’ learning engagement within their groups.

Examples of student responses:

(C2) The teacher set time and classrooms between the scheduled class meetings for the group work. Our group used the allotted time for individuals’ independent learning and group discussions.
we did not have to attend the class every week during the course, the teacher set some free weeks amongst the class meetings for the groups’ independent work. These weeks were really necessary for the group’s gathering additional resources and further investigation. In these weeks, we contacted the teacher via email or telephone for further consultation.

Students’ perceptions on the teachers’ facilitation in the PBL class showed that the teachers’ role was that of facilitators who mainly supervised student learning, without much direct intervention in students' learning activities and only providing help when requested. Arambula-Greenfield (1996) asserts that teachers must play the role as a tutor or a cognitive coach who models inquiry strategies, guides investigation, and helps students explain and pursue their research issues. Also, according to Wilkerson and Gijselaers (1996), facilitators mainly provide scaffolding guidance in the learning process rather than being disseminators of knowledge.

Extracts from student interview:

(S1) My teacher provided us with learning internet links. He rarely gave direct answers to the groups. For instance, any learning difficulties were raised during the PBL sessions, the teacher only gave us some explanation or suggested some additional learning materials to encourage us to do further investigations. Moreover, when group conflicts occurred in the learning process, the teacher only provided consultation for the group to solve the conflicts by itself. The group often reported to the teacher the progress of the group every class meeting so that the teacher knew if
the group could have kept on the right track to find tentative solution for the problem assigned.

(S2) First, she provided us with website addresses to search for necessary materials. If we have not gathered enough learning resources as requested, she would lend us some learning materials from her own book collection. Some group conflicts arose in the learning process. Some of them were solved through the group discussions; some were solved through consultations with the tutor.

S7: The teacher provided guidance for the group such as learning resources from the beginning. She also checked the progress of the group. Actually, as we have been quite confident with the learning problem chosen, we mainly worked and solved the problem on our own.

(S9) with some problems given, learners might have difficulties with new conceptions, definitions.... The tutor was always around to facilitate the group work in class meetings. When the group had any unresolved issue, the facilitator provided more guidance such as learning resources for further investigation. The facilitator sometimes raised some scaffolding questions to help the learners have better understanding of the given problem and find tentative solutions for the problem”.

(S10) After introducing learning problems to the class and assigning them to the groups, the teacher only showed the groups where to find the necessary learning resources for solving the assigned problem. She rarely gave the direct answers of the
problems to the groups. She only guided students to collect additional resources to solve any learning difficulties which arose during the learning process.

(S11) In the PBL sessions, the tutor walked around and observed while the groups were working and provided help if needed. If there are any unresolved issues in the groups, the teacher will only explain the key words/terms so that the group would further anticipate the strategies for solving the problem. Moreover, the tutor rarely had direct involvement in the group work.

It is interesting to note that some teachers listed several “additional” roles. For example, the teachers gave student timely feedback, helped students solve conflicts arising during the group work process or steered “slackers” in the right direction. An extract from student interview (S2) described the collaboration process: There were some group conflicts arisen in the learning process. Some of them were solved through the group discussions; some were solved through consultations with the tutor. Generally, the group often reported to the tutor what the group were doing and the progress of the group. Seriously, some group members stopped working and left the discussions because of group conflicts when the group work was in progress, but they then got back to the group discussion when the teacher helped the group solve the conflicts.

Teaching using a PBL approach encouraged the teachers to use a range of criteria to assess students’ in-progress performance. However, a written final test as the only assessment in traditional teaching was still administered in most classes where a PBL approach was implemented. The written final test used in these PBL classes
accounted for a greater part (60% - 70%) of the course assessment (see Tables 38 & 39 for reference). The teachers diversified their assessment by using in-progress assessment during the study. Allen, Duch, and Groh (1996) argue that students can be assessed by their peers using a numerical scale based on “attendance, preparation for class, listening and communication skills, ability to bring new and relevant information to the group, and ability to support and improve the functioning of the group as a whole” (p.49). The criteria of the in-progress assessment used differed between the teachers in the study. In particular, two classes (C2&3) used in-progress assessment based on a range of criteria. It is interesting to note that these two classes were facilitated by the two teachers (T2&3) who had previous experience of PBL. Prior experience of PBL may give teachers confidence to try new assessment approaches.

It is, however, surprising that most teachers still administered a written test which accounted for a greater part of the course. Vietnamese learners are still traditionally assessed (Pham & Fry, 2004). In particular, students’ performance, especially in tertiary education, is presently assessed based only on a written-final test which accounts for 100% of the course assessment. It should be noted that assessment styles are often prescribed in the national/university assessment policy in Vietnamese education and teachers have to follow the ones prescribed for assessing their courses.

Although education policy encourages innovative teaching approaches it does not seem to trust different approaches to assessment. The implementation of innovative assessment is still limited in Vietnamese education although assessment styles such as multiple-choice test have been recently introduced. This multiple choice test is,
however, seen to be limiting in assessing students’ writing skills. Although Vietnamese teachers have been encouraged to use innovation in their assessment by composing mid-term and final assessment tasks to assess students’ performance, their belief and experience using traditional assessment styles may have prevented them from changing. I argue that these may be the reasons why a large number of teachers (8 participants) still applied a final written test in assessing students’ performance. Even teachers with experience of PBL prior to participating in the study used traditional assessment methods as the major component of their assessment.

It is interesting to note that students in C7 were finally assessed based on the results of groups’ final presentations and peers’ feedback. I argue that the teacher (T7) was amongst those having PBL experience prior to participating in the study and she taught a discipline which was directly related to teaching and learning theories, Introductory Education. Therefore, she may have decided to model an innovative assessment. An extract from student interview (S7) supports her approach: *During the course, the teacher mainly encouraged the groups to focus on solving the learning problems chosen. Bonus marks were additionally given to those who actively engaged in the group work. At the end of the course, the teacher based on the final results of the group presentations as well as feedback collected from the groups to decide final result for each group member.* Also, students in C11 were finally assessed by completing a multiple-choice final test. This may be a new assessment style the teacher (T11) wished to implement in the class as it has recently been introduced to his discipline, however it did not link with the PBL approach.

Extract from student interview:
(S11) During the course:

The tutor commented on what the groups had done; strengths as well as weaknesses. The in-progress assessment was based on the results of the group representation accounted for 30% of the total assessment of the course.

At the end of the course:

The students were required to sit for a multiple-choice test individually. This accounted for 70% of the total assessment.

It appeared that the teachers may be ready to implement an innovative approach in organising their teaching, but the assessment styles used still remain traditional. The results of the study showed that traditional assessment styles were still used to assess students’ performance although the teachers were first introduced to a range of innovative assessment styles often used in the implementation of a PBL approach at the PBL workshops. It is, however, interesting to note that two (T7 & 4) of four teachers (T2, 3, 4 & 7) who had experience of PBL prior to participating in the study implemented several innovative assessment styles in assessing their students’ performance. I argue that the teachers’ prior experience of PBL influenced their desire to implement innovative teaching and assessment approaches while implementing a PBL approach. It is now a challenge to help teachers trust these innovative assessment approaches as an authentic way of assessing student learning.

The results of the study showed that the students expressed a thorough understanding of expectations of PBL in learning through this approach (see tables 40, 41 & 42 for reference). For example, the students pointed out the necessity of having an
understanding of learning outcomes, benefits and challenges of PBL, and a good background in subjects prior to commencing the course.

One student from C5 responded that:

- **Prior to the course:**
  
  *I used to work on my own and it was hard for me accept the peers’ ideas. I considered my own ideas to be the most possibility.*

- **During the course:**
  
  *I knew other group members well prepared for their assigned issues and I learnt to have careful preparation for my assigned one before the group meeting. This made the group work more successful.*

- **After the course:**
  
  *I learnt the ways of collaborating with group members, organising the group work, feeling more confident in expressing personal ideas to the group. Particularly, I have gradually changed in my learning and working approaches.*

According to Dion (1996), the teacher should have a deep understanding of the purpose, the procedures and the expectations of implementing a PBL approach as it is useful in helping the teacher know how to encourage students to actively engage in the learning process. I argue that in learning through a PBL approach learners are expected to work independently as well as collaboratively in order to bring their own contribution to their group’s tentative solutions to the learning problems. Therefore,
learners’ learning motivation should be triggered by the facilitator from the beginning of the course.

The results of the study showed that the students expressed their rich learning experience of working in groups after participating in the classes where a PBL approach had been implemented. For example, the students commented on a range of successful group work skills such as setting group norms, regularly participating in scheduled group meetings and collaboratively engaging in the process of finding tentative solutions to the group’s learning problem. According to Brimble and Davis (2005), implementing group work in PBL is one of the ways to create opportunities for students to interact with one another. Furthermore, students as group members have to take responsibility for their own work completion. Students learn to honestly self-assess their contributions and that of their peers. It is very interesting to note that the students also showed respect for group members by patiently listening to their diverse ideas as well as giving them constructive comments. Learning respect for the ideas of others is an essential skill in collaboration and team work.

Students commented that their skills were enhanced in problem solving, collaboration, critical thinking and communication. All students found the group work beneficial for them. Brimble and Davis (2005) also assert that PBL learners have to play diverse roles during PBL such as leader, recorder, critic, discussant, teacher, researcher, presenter, communicator, problem solver as well as facilitator. The learners, therefore, gradually gain a range of skills in team-work, communication and problem-solving. Student interview two (S2) describes this process: Through PBL, I had opportunities to develop skills in critical thinking and team-working, especially know how to work...
with other group members effectively. I have learnt how to express ideas during the
group work, have appropriate and effective responses to other groups in class
presentations and learn from their ways of learning and thinking. Particularly, I feel
more confident in communication and have had opportunities to learn from other
subject-related areas while searching for resources to solve the problem. The results
of the study showed that not only did the teachers gain a deep understanding of PBL,
but the students also had a good understanding of the approach.

During the process of learning through the PBL approach the students also faced a
variety of challenges. The students found it time consuming and felt enough time was
not allocated to find solutions. The students also expressed that they found it difficult
to take notes while listening to other groups’ presentations or deal with more than
three courses which were implementing a PBL approach in a semester. I argue that as
the students had to prepare for their final written examination which did not link with
the teaching style in PBL which focuses on tentative solutions rather than right
answers - they were challenged by two conflicting approaches to learning. One
student (S2) responded in the interview:

I have found some negative aspects in learning through a PBL approach:
-Time-consuming, time allocation for the given problems was rather little.
-Some group conflicts were not easy to be solved.
-It may cause some difficulties for me in taking notes to prepare for their final written
test which was much based on the subject content of the course.
-It is challenging for the students to deal with 3 or 4 subjects which are implemented
a PBL approach in a semester only.
However, it is more advantageous learning through a PBL approach than other traditional methods like lecture-based learning. The results of the study showed that the students commented on a range of positive aspects of PBL and negative aspects of traditional methods when comparing their learning experience amongst the approaches (see table 43). Albanese and Mitchell (1993) assert that studies show no considerable difference in the learning outcomes of subject content achieved between students learning through PBL as well as a lecture-based approach, but according to Farnsworth (1994), there was a better long-term retention in PBL students. In addition, Bransford, Franks, Vye and Sherwood (1989) assert that PBL students are seen to be more likely to apply problem-solving skills gained to solve new problems than those who gained similar subject-content through lecture-based method. According to de Vries, Schmidt and de Graaff (1989), students learning through a PBL approach develop their professional skills more than those working through a lecture-based approach. I argue that although there were a variety of challenges the students faced during the process of learning through a PBL approach, they responded positively towards PBL. They had an array of activities to learn independently and collaboratively. They also had opportunities to work to the best of their ability to reach a range of tentative solutions to their assigned problems as they knew that their learning contribution would be respected and valued by their peers.

Extracts of student interview:

(S1) In comparing between learning through lectured-based method and PBL approach: I think it is quite boring when learning through traditional methods like
lecture because we just sat silently in class and listened to the teacher. I did not have any social activities like group work, discussion or presentation. We sometimes felt tired and sleepy in some long lectures. I think, we only compete with other class members in lecture-based class to get better results, not collaborate with them like in PBL class. In PBL class, we actually had many opportunities to work with our peers.

(S2) Learning through other conventional methods, I found that I:
- Could not retain much information after a period of time.
- Boring learning environment
- Not developing some learning and working skills such as teamwork skill, leadership skill, problem-solving skill, communication skill and so on.

When learning through problem-based learning:
- At the beginning of the process of PBL implementation, group members had many learning complaints as they had to do a lot of things finding resources as well as solving the given problems while they were not required to do such things in other lecture-based subjects. After several classes, group members found this learning approach much more interesting than the prior traditional methods as they have learnt much from what they have done in class.
- Besides subject content gained, many skills have been improved in learning through PBL approach.

(S7) I really like learning through problem-based learning because:
- It promotes the learners’ independent study and creativity in the learning process. However, if the tutor believes too much in the learners’ ability of self-study, it will take much time for solving a single problem while there are also many necessary
issues to be learnt. If the tutor intervenes too much in the group discussion, it will just encourage the learners to follow what the tutor has suggested.

-The greatest shortcoming of implementing problem-based learning is that it much depends on each member and group’s motivation. If the lecturer does not fulfil their role as a responsible facilitator, the expected outcomes might not be achieved.

(S8) In PBL class, students do not feel bored as in lecture-based class. Moreover, it is quite easier for students to acquire and memorise the subject content expected than in conventional classes. PBL learners self-focus on their own learning, not depending on the tutor’s teaching. Students have opportunities to state their own ideas on the learning topics.

(S9) Learning through problem-based learning, I found that:
- It made the learners more active in the learning process.
- Every learner had their opportunities to contribute to the group discussion so that the facilitator could get the feedback from each learner as well as evaluate the learner’s level of understanding on the given issue.
- The learners will enhance their skills in teamwork, presentation. The learning environment is more fascinating, and learning products are varied as different ideas are gathered from most of learners.

(S11) I think learning through other conventional methods do not create an environment which motivates students’ learning interests in the learning process.

Learning through problem-based learning:
- Promotes students’ thinking.
- Motivates students’ learning interests in seeking a variety of tentative solutions for the given problems.

- The students feel interested as they are likely the very persons who have found new knowledge and skills expected through the process of solving the given problems.

The acquisition of skills in learning through a PBL approach is seen to be valuable for students’ future career (see table 44). The results of the study showed that the students seemed to be optimistic about the usefulness of the learning skills they achieved. Besides the subject content, they discussed a range of skills they had attained such as collaborating, communicating, problem-solving and self-directing. I argue that these skill outcomes are really new and beneficial to the Vietnamese students. In addition, Boud and Feletti (1991) assert that PBL is recognised as an important development to teaching for professions. With the learning outcomes of both subject content and processing skills, students can enhance their knowledge as well as learn how to learn during the process of learning through the approach. Delisle (1997) also claims that “students who were taught through PBL became self-directed learners with the desire to know and learn, the ability to formulate their needs as learners, the ability to select and use the best available resources to satisfy their needs” (p.3).

A variety of extracts from student interviews are as follows: …What I learnt from this innovative learning is really useful for my present learning and my future career as well. I am learning to be a high school teacher, so these skills like team-working, problem-solving, critical-thinking will be very good for my future teaching profession (S1); …I have learnt how to use facilities in support of my future teaching and learning. In addition, learning through a PBL has improved my research skills. I have
learnt how to organise teamwork and express personal ideas in a public confidently (S7); ...Studying through a PBL approach, it helped me know how to solve the problems in flexible ways, especially in finding tentative solutions. I actually feel more confident when struggling with daily life problems (S8).

There has been an effective change in student perceptions during the process of learning through a PBL approach. Not only did the students gradually gain a deep understanding of the PBL approach itself, they also obtained a range of the learning outcomes connected to the PBL process. I argue that the new skill attained through PBL will be beneficial in the students’ future professions.

In analysis of teachers’ and students’ experiences of PBL, there were a wide range of positive outcomes of the study. The results of the study showed that the teachers changed their teaching approaches by designing learning problems and scaffolding students’ learning process. The teachers effectively collaborated with each other in the implementation of PBL by willingly sharing their expertise of PBL in the workshops and supporting each other in designing learning problems as well as during the process of PBL implementation.

The teachers performed an efficient facilitation in their PBL classes by interacting more with students and getting known them well. The teachers provided timely feedback which allowed students to change their approaches to learning rather than getting results at the end of course which may be too late to make improvements. In addition, the complexity of the PBL implementation was directly aligned to the amount of prior experience of PBL the teachers had. Those with prior experience of
PBL showed their expertise in the PBL implementation in a range of aspects such as preparation for PBL, allocation of student groups, facilitation of student learning and trusting assessment process.

Regarding positive outcomes of the study for students, students expressed their positive responses in engaging in PBL classes. They were optimistic about the potential benefits of PBL. Moreover, the students effectively collaborated with their peers in the process of learning through a PBL approach by assigning the learning issues to one another, sharing learning resources gathered as well as contributing to the tentative solutions to the learning problem of their groups.

More important, the students commented that they had attained a range of efficient skills in their group work, problem solving and self-directed learning and communication. They also commented they felt more confident after the process of learning through a PBL approach, especially in presenting their own ideas to the class. It is interesting to note that the students commented they had learnt to respect their peers by attentively listening to their own ideas as well as giving constructive comments to them.
6.1. Strengths and limitations of the study

As the investigator, I had opportunities to introduce a PBL approach to a range of Vietnamese tertiary classes which were previously taught using traditional approaches such as lecture-based learning. Although the PBL approach had been previously implemented in several Vietnamese university classes by a few teachers prior to their participation in the study, some of these teachers had simply adopted some aspects of PBL that they had experienced themselves. However, prior to participating in the study, the teachers were provided with a range of PBL resources by me. They also had the opportunity to participate in the three-hour PBL workshops I taught. These PBL materials and workshops increased the teachers’ understanding of the key issues involved in implementing PBL and helped them prepare more effectively for their PBL implementation. In addition, I offered to provide teachers and students with teaching and learning support when requested during the process of implementing a PBL approach in their classes.

The study was effectively supported by teacher and student participants who showed their excellent participation rate in the study. This also confirmed the teachers’ and students’ strong commitment in the implementation of a PBL approach. Their voluntary involvement in the study was seen to be valuable for gaining the reliable and positive outcomes of the study. In particular, the strong commitment of
participants and a well executed methodology allowed me to collect a range of rich
data for the study.

In addition, the excellent participation rate also demonstrated the readiness and
enthusiasm of teachers and students in teaching and learning using the PBL approach.
The teachers supported the study which may have helped them reflect on their prior
teaching and seek ways to further improve their performance. Also, the students were
interested in learning through PBL as this approach may have enhanced their
understanding of this alternative approach to teaching and learning.

My research design was useful in helping me with effectively conducting the research
phases. My research design, principally based on the qualitative approaches, was
viable in collecting a wide range of participants’ perceptions to teaching and learning
using a PBL approach. The rich and valuable data were effective in answering the
research questions.

Despite the limitations of teaching and learning facilities such as limited classrooms
for group work, few computers, very slow and limited internet access and old library
resources, the study showed that PBL can be constructively implemented in the
Vietnamese setting. Vietnamese teachers acted as “floating facilitators” when
implementing PBL in teaching a range of their university courses without tutorial
support. They creatively solved the problem of limited library resources by providing
students with learning resources from their individual book shelves.
The big question of knowledge acquisition; and understanding of subject content; was not investigated in this study. Although the study highlighted positive aspects of process, we do not know if it was at the expense of content. Williams (1999) found that nursing students were lacking in fundamental knowledge following PBL implementation although it enhanced other skills. Further study would be needed to examine the impact of PBL on the level of acquisition, understanding and retention of content information.

The teachers, however, mostly used the hybrid model of PBL, and no teacher participants used the “pure” model. Savin-Baden and Major (2004) assert that the “pure” model of PBL is similar to the McMaster version of PBL with learners working in groups and having no lectures or tutorials. In addition, the “pure” model is seen to be the most demanding one in comparison with other hybrid versions of PBL. This may contribute to why all the teachers did not wish to choose the “pure” model of PBL as more than half of student participants were new to PBL even though there were several teachers with experience of PBL prior to participating in the study. My analysis of the data suggests that the “pure” model was probably too challenging for teachers who were new to PBL.

In the study students named a range of skills they perceived that they had achieved in learning through a PBL approach. A future study could investigate if PBL has become embedded in these university courses as an ongoing process and in what forms or it terminated with the study. I would also like to know if a PBL approach has the potential to be used more widely in Vietnamese tertiary education. Further study may even explore the extent to which the range of skills reported in PBL had been
achieved to see how efficient PBL would be in supporting Vietnamese students in their future careers.

6.2. Conclusions

The review of teaching and learning theories shows that innovative approaches should aim to promote learners’ reflective, creative and critical thinking, not just impart information to them. Moreover, the learners also learn better when their diverse approaches to learning and thinking are considered by their teacher (Sternberg, 1998). According to Duch, Groh and Allen (2001), traditional approaches like lecture-based learning which have been used in most classes in conventional education often fail to encourage learners to become active learners.

Vietnam education has been highly influenced by Chinese dynasties’ Confucian education. Traditional teaching and learning approaches are still being largely used in Vietnamese education (Pham & Fry, 2004). In addition, Tran Quoc Toan (2008) reports that Vietnamese graduates who have been principally taught through traditional approaches are not fully prepared with a range of necessary skills for the working environments in the 21st century. Therefore, according to Pham and Fry, the Vietnamese government has expressed its concerns about this educational problem and encouraged teachers to seek ways to educate students to become high-quality graduates who can effectively work in a wide range of working environments.

In the current study, although teachers’ and students’ participation in the study was voluntary, no one withdrew from being involved in the research. This strong
participation suggests that all teachers and students were enthusiastic toward participating in the study. In particular, it is interesting to note that the teachers were ready to implement a PBL approach in teaching their university classes and the students also showed their enthusiasm in learning through this innovative approach. Both teachers and students positively responded to the implementation of a PBL approach in Vietnamese university classes.

It is surprising to see that Vietnamese teachers and students effectively adopted the PBL approach as I, at first, thought PBL would be more challenging for these teachers and students who had previously interacted using traditional approaches. Through the study I can see a range of possibilities and flexibilities of implementing the PBL approach in Vietnamese university classes. Another surprise was that although more than half of teacher and student participants had no experience of PBL prior to participating in the study, they willingly embraced a so-called “demanding approach” like PBL, very different to usual approaches from traditional classes.

It is also interesting to find that teachers’ prior experience of PBL was very useful in supporting them in effectively organising the PBL class sessions. Experienced teachers were able to select problems related to the interests of students, trust students to select their own groups, expect students to find some resources themselves and integrate group work into the assessment as well as the learning process to a much greater degree than their less experienced colleagues.

It is encouraging to see Vietnamese teachers and students readily embracing most of the processes when teaching and learning using a PBL approach. In particular, they
effectively implemented a wide range of learning stages required in PBL. There was one exception; the teachers were reluctant to use authentic assessment particularly as the final assessment of the course. The heaviest weighting of assessment was still placed on the final written exam. The teachers were not yet at the stage of trusting the assessment approaches that match the PBL model. They reverted to traditional assessment. For instance, most teachers administered styles of in-progress assessments based on a variety of criteria which are often seen in PBL assessment, but they still used a final written exam which accounted for a large percentage (60% to 70%) of the course.

Differences could be found in relation to the model of PBL adopted and the level of experience in teaching using a PBL approach. Teachers who were more experienced with implementing PBL used it throughout the whole course rather than in some modules. The majority of teachers used the hybrid model - PBL on a shoestring. According to Savin-Baden and Major (2004), the model of PBL on a shoestring is appropriate to be implemented in scattered units of the module with nominal cost. My study results showed that more than half of the teacher participants were new PBL practitioners. They therefore would have implemented this hybrid model of PBL in their classes in a cheap cost effective and low key and quiet way without impacting greatly on other teaching staff. Also, mini lectures can be designed as ways of facilitating the student learning (Savin-Baden & Major, 2004).

PBL has been introduced in the Asia-pacific region for over ten years (Khoo, 2003). Achike and Nain (2005) further assert that “the delay is attributable to such factors as the lack of leading regional PBL experts, conservative attitude with attendant
resistance to change, and the long standing myth that Asians students are not suited to the PBL approach” (p.303). However, this study showed that Vietnamese teacher and student participants willingly adopted the PBL approach even though they also faced a range of challenges in the process of implementing the approach such as limited time allowance scheduled for learning units, heavy study load and group conflicts. Khoo (2003) further claims that Asian students can adjust their learning practices when being placed in a new learning situation. The study confirmed these findings as the responses from students showed that although they found it a little strange at first they readily became used to the benefits of the active learning in PBL.

6.3. Recommendations

The study showed Vietnamese university teacher and student participants effectively adopted a PBL approach. In particular, all the teachers considered PBL as a worthwhile approach for the teaching profession. Therefore, my study suggests that PBL could be introduced on a wider scale to other Vietnamese tertiary teachers in order for them to diversify their teaching approaches to improve their teaching. Moreover, the students all commented on the worth of PBL and showed their desire to have opportunities to learn through the PBL approach.

I hope to disseminate my findings to interested educational administrators and teachers in other Vietnamese universities to demonstrate how a PBL approach was effectively implemented in Vietnamese university setting. As a result of this, hopefully, Vietnamese educational managers would encourage a larger number of
teachers to implement PBL in teaching as well as provide a range of support for the teachers during the process of PBL implementation.

In addition, I strongly recommend PBL not only to be used in teaching Vietnamese students in different universities but it should be implemented in a wider range of disciplines as well. Historically, PBL was introduced into medical education and other health sciences prior to being introduced in the social sciences. This study confirmed positive responses from teachers and students in the social sciences to the PBL approach, a new area for consideration.

The policy makers should encourage teachers to continue to build their skills in PBL. The study showed that the more experienced and familiar with PBL the teachers were, the more sophisticated the implementation strategies adopted. In this area, teachers should have an administrative support for their implementation of PBL. According to Achike (2003), administrative support is a significant factor for the success of the implementation of PBL. Therefore, I would have the findings of my study published in a range of Vietnamese educational journals in order to argue the effective impact of PBL in Vietnamese setting to a larger number of educators.

The implementation of a range of communication methods in PBL increases the interaction between teachers and students as well as between students and therefore it is useful to enhance students’ collaboration and team-working skills. I anticipate that further administrative support in the form of a wide range of communication methods such as fast internet access would enable teachers and students to more actively engage in the process of teaching and learning using a PBL approach.
Additionally, the teachers should be encouraged and permitted by the administrators to implement authentic assessment practices to support the PBL approach to teaching and learning. Meier et al. (1996) suggest that the focus test will deter teachers from using a PBL approach. If it is the case it is essential that the assessment system changes to match the one that measures objectives using a range of processes.

In the long term, I expect to introduce the results of my study to a range of international educational researchers at conferences and journals. I am hoping that my study would make a considerable contribution to the international experience of PBL practices. In particular, the implementation of PBL to teaching and learning in an Asian developing country like Vietnam would be beneficial for educators in other Asian developing countries in improving their teaching.

Vietnamese education is gradually making changes in teaching and learning approaches. I am expecting to contribute to these educational changes through my study. I strongly suggest making the changes more effective when Vietnamese educators systematically consider all factors in the teaching and learning process such as the importance of clear objectives following all steps in the process including consistency in style of teaching and assessment.

Above all, I have, through this study, built on my profession with a wide range of teaching and learning experiences. This study is very important to me as I myself have found possibilities for many unsolved teaching and learning problems I faced prior to the study. I am looking forward to going back my teaching position in Vietnam and eager to share my learning experiences with my teacher students and colleagues. I believe that the experiences will help my teaching be more effective.
Vietnam is integrating with the world and Vietnamese graduates are gaining opportunities to engage in a range of global working environments. To fully take up the opportunities, Vietnamese tertiary students have to be educated through active and learner-centred approaches such as PBL which help them effectively improve a wider range of skills, such as problem-solving, team work, communication, critical thinking as well as leadership. These skills are not only effective for students’ present learning process but they are also useful for their future careers. To meet these working demands, Vietnamese policy-makers are making changes for Vietnamese education in curriculum development as well as teaching and learning approaches. Further, they are encouraging educators to implement a wide range of innovative approaches, one of which includes PBL. However, to effectively implement an innovative, challenging approach like PBL, Vietnamese policy-makers and teachers have to change their beliefs about traditional teaching first. It is challenging for teachers to change their perspectives of the teacher as the authority and move towards empowering students as learners. Further, my study suggests that the policy-makers should be aware of providing a range of support for the teachers to enable them to implement PBL. I also suggest that the teachers should be especially paying attention to designing authentic problems, having students form small groups for collaborative work, facilitating and supporting students’ investigations and providing opportunities for students to reflect on the learning process as well as content during assessments. In this way, Vietnamese education can produce a new generation of graduates who can efficiently contribute to the development of their country.
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Appendix 1

Letters to teachers and students and plain language statement to be used in a research project involving human participation (see next pages attached)
Appendix 2

Teacher Questionnaire

This section of questionnaire has been designed to gather information on the implementation of a problem-based learning approach across a range of university classes in Vietnam.

Name of the university you are working for: _____________________

Please tick the box that represents your choice

1. How many years have you been teaching?
   - Less than 5 years  □
   - 5-10 years  □
   - 11-20 years  □
   - More than 20 years  □

2. What is your qualification level?
   - Bachelor  □
   - Masters  □
   - Doctor of philosophy  □
   - Other: _____________________

3. How many periods of the course that you are teaching have you used to implement a problem-based learning approach (PBL) this semester?
4. What year level are you implementing a PBL approach in teaching?
   - First year
   - Second year
   - Third year
   - Fourth year
   - Other

5. The discipline you are teaching belongs to:
   - Natural science
   - Social science
   - Humanity science
   - Other

6. Prior to implementing a PBL approach for the purpose of this study, what has been your experience or knowledge of this approach?
   Please comment:

   ___________________________________________________________
   ___________________________________________________________

7. What resources/readings provided about PBL for this study did you find helpful?
   Please explain why:

   ___________________________________________________________
8. How helpful were the workshops in providing an understanding of the process of implementing a PBL approach to teaching and learning? Please comment:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

9. Did you gather extra PBL resources beside the PBL workshop before implementing the approach?

________________________________________________________________________

________________________________________________________________________

10. What specific preparation was necessary for you to undertake your first PBL class?

________________________________________________________________________

________________________________________________________________________

11. How did you prepare your students before the implementation of the PBL approach?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
12. How did you group your students in PBL class?

__________________________________________________________________________

__________________________________________________________________________

13. Explain how you facilitated your student learning during your PBL class?

__________________________________________________________________________

__________________________________________________________________________

14. How did you assess your students in the PBL class?

Please comment the ways of assessment:

__________________________________________________________________________

During the course:

__________________________________________________________________________

__________________________________________________________________________

At the end of the course:

__________________________________________________________________________

__________________________________________________________________________

15. What do you see as the most important part in preparing for a PBL class?

Please comment:

__________________________________________________________________________

__________________________________________________________________________

16. What do you see as the most important part in the process of implementing a PBL approach in class?
Please comment:

17. What do you see as the positive aspects in the process of implementing a PBL approach?

Please comment:

18. What do you see as the negative aspects in the process of implementing a PBL approach?

Please comment:

19. What is the biggest difference between the PBL approach compared with teaching through other methods?

Please comment:

Please send your completed questionnaire in the enclosed stamped addressed envelope to my indicated address.

Thank you very much for your participation.
Appendix 3

Student Questionnaire

This section of questionnaire has been designed to gather Vietnamese university students’ perceptions in learning through a problem-based learning approach.

Name of the university you are studying at: ________________________

Please tick the box that represents your choice

1. What year level are you studying?
   - First year  □
   - Second year □
   - Third year □
   - Fourth year □
   - Other ..................

2. Have you ever been taught through a problem-based learning approach (PBL) before this implementation?

   Please comment:

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

3. How have you been prepared for your PBL class?

   Please comment:

   __________________________________________________________
   __________________________________________________________
4. Have you been grouped in PBL class?
If so, how have groups been organised?
Please comment:


5. How have your group members assigned one another to solve the learning problems?


6. How have you worked with other group-members in class to solve the assigned problems?
Please comment:


7. How have you worked with other group-members out of class in finding solutions for the assigned problems?
Please comment:
8. How have your group members done in reaching an agreement in discussion?

Please comment:

________________________________________________________________________

________________________________________________________________________

9. How has your teacher’s role been different in PBL class compared with other classes?

Please comment:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

10. Were there opportunities for self-directed learning during these classes?

Please comment:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

11. Were there adequate resources available for your investigations?

Please comment:

________________________________________________________________________

________________________________________________________________________
12. How has the teacher assessed your group-work?

Please comment:

During the course:

________________________________________________________________________

________________________________________________________________________

At the end of the course:

________________________________________________________________________

________________________________________________________________________

13. What is your learning experience in PBL class?

Please comment:

Prior to your class

________________________________________________________________________

________________________________________________________________________

During the class

________________________________________________________________________

After the class

________________________________________________________________________

14. Please compare on your perceptions about learning through the process of a PBL approach with other methods?
15. Have you acquired any skills through the PBL approach that will help you in your future career?
Please comment:


16. Please indicate if you would be happy to participating in in-depth interview.

   Yes □

   No □

Your name is: ___________________ Class: ___________________

(This information will be kept confidential and is only used so I can contact you to arrange for an interview)

Please send your completed questionnaire in the enclosed stamped addressed envelope to my indicated address.

Thank you very much for your participation.
Appendix 4

Teacher interview questions

The following interview questions have been designed to have lecturers explain further the information given in their questionnaire.

1. Have you ever used a PBL approach before attending the PBL workshop sessions?

2. Please comment on the preparation workshops and resources provided prior to your teaching using a PBL approach.

3. Please comment on the resources used to support your PBL teaching.

4. Please comment on the selection of the problems to be investigated.

5. Discuss your role as a teacher when using the PBL approach.

6. Discuss the allocation of student groups.

7. How have you facilitated your students during your PBL class?

8. How have you assessed you students in your PBL class?

   During the course:

   At the end of the course:

9. What do you see as the **positive aspects** in the process of implementing a PBL approach in class?

10. What do you see as the **negative aspects** in the process of implementing a PBL approach in class?

11. Discuss your experiences of a PBL approach compared with teaching through other methods?

12. Have you found the PBL approach a worthwhile approach to use with students?
Appendix 5

Student interview questions

The following interview questions have been designed to have lecturers explain on the information given in their questionnaire.

1. Discuss your experiences of problem-based learning approach (PBL) before this implementation.

2. Discuss your preparation prior to attending your PBL class.

3. What were the positive aspects for you of learning using a PBL approach?

4. Discuss how your group worked together to solve the problem.

5. Did you work with other group members out of class in finding solutions for the assigned problems?

6. How has the teacher helped your group with solving the difficulties of learning?

7. Which resources have your group gathered for solving the learning problems?

8. How have you found the resources?

9. How has your teacher assessed your group-work?

During the course

At the end of the course

10. Please discuss your perceptions about learning through the process of a PBL approach with other methods of learning.

11. Have there been any benefits for your future career from learning through a PBL approach in this course?
Appendix 6

Outline of the PBL workshops

(2 workshops of 3 hour each)

1. Introduction: (30 minutes)
- Acknowledging the teachers for their participation in the workshops and the implementation of PBL in one of their university classes.
- Introducing the study to the teachers (snapshots)
- The purpose of conducting the PBL workshops prior to the implementation.

2. Teaching (1 hour 30 minutes)
- I (the investigator) introduced a summary of PBL features to the teachers based on the PBL resources provided prior to the workshops (PBL objectives, preparation strategies for PBL implementation, facilitation strategies in PBL class, assessments used in PBL).

Tea break: (15 minutes)

3. Discussion (Question and answer time – 1 hour)
- The teacher participants raised questions to the class and the investigator about the issues in implementing PBL.
- The teacher participants and I, the investigator, explained and answered the questions to help the teachers further their understanding of PBL.

4. Notes:
- Introducing my contact details and email address to teacher participants