

PBL EXPERIENCE IN BUSINESS PROGRAMS: DO DISCIPLINES MATTER?

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This study describes an educational experience in a pre-masters business level problem-based learning environment and examines student attitudes and perceptions related to this educational experience. In particular, it investigates whether there is a significant difference between the benefits gained from PBL across the two disciplines: Accounting and Statistics; and whether PBL is a preferable method to the traditional method of instruction or vice-versa. Analysis of the findings indicated that the PBL scores for Statistics were significantly lower than that for Accounting at the 0.05 level of significance. Students seemed to gain more benefits in Accounting PBL tutorials than in Statistics PBL tutorials. The qualitative data on the preference of PBL to the traditional lecture method of instruction also showed that the implementation of PBL is perceived to be more successful in the Accounting discipline, while less successful in the Statistics discipline. The findings from this study further suggest several strategies that the course coordinators and tutors can undertake to promote innovative student learning.

INTRODUCTION

Throughout the Asia-Pacific region there is an emerging interest in using Problem-Based Learning (PBL) as an alternative teaching approach to the traditional-lecture type approach, in an attempt to better prepare students in this world of accelerating change. In Hong Kong, participants in a range of PBL projects have introduced the concept of PBL to a wide variety of health science disciplines as well as explored its applicability in other disciplines such as the arts, social sciences and business.

There have been numerous studies showing that PBL is a superior approach to a traditional-lecture type approach in improving students' learning skills. For instance, Newble and Clark (1986) reported that PBL students possessed higher problem solving abilities than those from the conventional curricula. Lai et al. (1999) also revealed that the PBL class was superior to the control class in the overall grade in the mental health nursing courses. In a meta-analysis conducted by Vernon and Blake (1993) covering all the available evaluative research for the period 1970-1992 that compared PBL with the traditional-lecture approach in medical education, it was found that PBL was superior over the traditional-lecture approach

with respect to the students' attitudes and opinions about their program. The findings showed that PBL students not only placed more emphasis on understanding than on producing compared to students from traditional programs, but also demonstrated a greater independence in their learning method than did the traditional-lecture type students.

While many academics have introduced the concept of PBL to a wide variety of health science programs in Hong Kong, PBL is still in its infancy in the business program, particularly in the Hong Kong distance learning environment. Since the selected course for this study comprises several disciplines (Accounting, Statistics, Management Information System, and Economics), it is worthwhile to explore the students' PBL experience across disciplines. The rationale is that it is common everywhere that most business students are weak in Statistics and yet it is a core subject in any business undergraduate program. There may have been significant differences between Statistics and other disciplines with regard to the effectiveness of the PBL method. In view of these, the general purpose of this paper is to examine student attitude and perceptions of the PBL experience across disciplines. It will also investigate whether there is a significant difference between the benefits gained from PBL across the two disciplines, Accounting and Statistics, and whether PBL is a more preferable method to the traditional method of instruction or vice-versa.

The following research questions will be addressed:

1. What are the views of students about PBL experience compared to the traditional-lecture experience in general? What do students value the best/least about a PBL experience?
2. To what extent does the PBL experience promote students' learning across disciplines in terms of cognitive development, group learning and expectation?
3. To what extent do students prefer the PBL approach to the traditional approach across disciplines?
4. Is there any significant difference in the benefits gained from PBL across disciplines?

The first research question was addressed qualitatively by means of open-ended questions and personal interviews, while the rest of the research questions were investigated either quantitatively or qualitatively or both.

METHOD

Subjects

The subjects for the study were 87 students enrolled in one of the postgraduate business courses. The course is a first and compulsory course aimed at students who possess a non-business undergraduate degree with 2 years of working experience but who wish to pursue a master's degree in business administration (MBA). It is also aimed at students who only possess a diploma but have 6 years of managerial or supervisory working experience. The course itself is made up of four disciplines: Accounting, Business Statistics, Management Information System and Economics, with each carrying an equal weighting in the course assessment. As the course is still in progress, only the PBL evaluation of the first two disciplines (Accounting for the first 12 weeks of study and Business Statistics for the second 11 weeks of study) will be reported in this paper.

The Registry randomly assigned the students to tutorial groups. Each tutorial group was assigned an eminent well-qualified tutor who was responsible for marking their assignments, conducting regular tutorials and day schools as well as answering queries over the telephone.

Procedure

Prior to the tutorship commencement, tutors were trained in ways to develop tutoring skills by the University. They are expected to conduct student-centred rather than teacher-centred tutorials, and to manage the learning activities (OUHK, 2000). Their roles were spelled out clearly - not to lecture in the tutorials but to facilitate student learning. While there have been several suggested student-centred learning activities for tutorials, traditionally OUHK tutors are tempted or 'forced' to conduct lectures to students for one reason or another.

Prior to the commencement of the semester, both students and tutors involved in this study were well informed in writing about the tutorial format. At the first tutorial, the students were given a brief overview of how PBL would be carried out in the tutorials. To implement the PBL format successfully, students were informed that they should work in small groups, and at least one problem scenario would be despatched to them as a source of stimuli for their thinking and learning. They were expected to be active participants and the role of the tutors was that of facilitation. Both the tutors and course coordinator worked out the problem-based activities for the tutorials according to the general guidelines of PBL (Bridges & Hallinger, 1992). Problems were prepared in such a way that would stimulate students to think critically. To arouse students' interest, problems were as far as possible based on real life scenarios as well as ill-structured problems. The problems were sometimes adapted from the textbook or newspaper articles on current issues.

To incorporate cooperative learning, the tutor divided the students into 3 groups when they met in the first tutorial. About 6 to 8 students formed a group according to their residential districts. This attempt was made because the students would be likely to take the same transportation home after tutorials ended at 9:00pm. This give them more opportunity to communicate with each other while travelling. There were several rules established to govern the group process. First, unless they had a good reason to change groups, they were encouraged to remain in the same group throughout the year. Second, each group would have one leader and one secretary, who would be different for each tutorial. The role of the leader would usually be to report the group feedback to the class and the role of the secretary would be to jot down the various points raised by group members. Third, each group member would be given the same opportunity to express his/her views and to rebut other views expressed. Fourth, each group member is required to be respectful, thoughtful and cooperative even if he/she disagrees on some views.

There were four tutorials of 2 hours each for Accounting and Statistics respectively and there was a day school of 3 hours for Accounting and another 3 hours for Statistics. Prior to or during each tutorial, 1-3 short problem-based activities were distributed to the students. The activities aimed to trigger and guide their normal study activities either individually or collectively. Often they were given about half an hour to consolidate their thinking about the activities during the tutorial before they made a group presentation to the whole class. Similar to the tutorial format, the day school activities for Accounting were more on real life case studies whereas the activities prepared for Statistics were on a three-hour lecture instead.

Instrument

The instrument used in this study was adapted from Khoiny (1995). It was a 20-item questionnaire that measured the perceptions and attitudes of students toward the PBL method of instruction. The questionnaire consisted of 14 items on a 4-point Likert scale and 6 open-ended questions. For each of the first 14 items the students were asked to indicate from 1 (= strongly disagree) to 4 (= strongly agree). The other 6 open-ended questions asked for students' opinions about PBL. The validity and reliability of the instrument have been justified in Khoiny's work. The Cronbach alpha coefficients were high, 0.8598 and 0.8233 for Accounting and Statistics respectively. In-depth personal interviews were conducted as part of a larger scale research study and the relevant interview transcripts will be quoted in this study. Since the interviews were conducted during the Accounting study period, the interview questions were not able to explore student preferences about PBL compared to traditional lectures in each of the two disciplines. The questions were only restricted to the students' PBL experience in general, and the general preference of PBL to traditional lectures or vice versa.

FINDINGS

Respondents

At the time the study was conducted, there were 87 students enrolled in the course, of whom 53 students (60.9%) completed the self-reported questionnaire. The response rate was considered high while the response rate on the written questionnaire was in general around 34% of the respondents. These students regularly attended almost all of the PBL tutorials to date. Of the students, 44% are females and 57% are males. Nearly 80% of them are married and their mean age ranged from 36-40 years old. Moreover, 16 regular tutorial-attendee students were interviewed either on a face-to-face basis or over the telephone.

PBL Learning Experience

The findings in this paper are not strongly supported by other investigators' findings that PBL has been perceived highly by students (Albanese & Mitchell, 1993). However, the analysis of the PBL questionnaire data did point out a fairly favourable student attitude toward PBL. Of the fifteen questions, over 70% of the respondents rated PBL positively in thirteen questions. As for the remaining two questions that were not highly rated, only 53.8% and 68% of the students felt that they were active participants in the PBL experience for Statistics and Accounting respectively, and only 59.6% and 68% of them preferred the PBL method rather than the traditional-lecture method for Statistics and Accounting respectively.

Some students who preferred traditional lectures to PBL said it was not because they had strong resistance to PBL; it was simply because they were lazy and deeply rooted in the traditional teaching and learning environment since their early schooling.

I like the traditional one ... because I am lazy ... lazy in searching materials on my own, lazy in exploring new things ... Through traditional lecture, I am able to absorb something that was given out by the tutor ... faster.

Traditional one ... it is a tendency of using this format in learning ... like the situation in primary school.

Other students preferred PBL because the PBL process is perceived as another kind of training to the students, and because of its flexible mode of learning.

I think I don't prefer lecturing ... When you study MBA ... in the future ... in fact, to a large degree ... in university ... you learn on your own ... tutor is only a guide ... If you are taught like a secondary school student, the whole thing will lose its meaning ... really. And discussion is a good thing. You can express ... or whatever ... training ... it's another kind of training...

PBL ...more flexible ... Unlike lecture we are not forced to accept only one thing which is presented by the tutor. Each classmate has his/her own background ... with different views ... we are forced to accept the arguments when presented in a lecture. Now I am allowed to argue on something with other group members with the tutor facilitation.

Some students reflected that preparation work must be done before attending the tutorials. The objective of the tutorial is not for the tutor to lecture but to facilitate the students' learning. Without any preparation work, students would not gain much from the tutorials.

The students should be clear about the role of the tutorial. This is very important, I think. In fact, I have talked with some of them. Some of them are not in my class. Their thinking is different. Some do not study and just expect the tutor to lecture during tutorials. ... For some people, their expectations are not like this. They find it totally useless to come for tutorials... This is really true. Because they have read nothing before class. Because in fact you should do some reading before you come to class. Do not expect... to talk about (the material content) here. If you haven't done anything, of course you don't know what all of this is about...The teaching method is different...Time is so limited... there are only two hours. What on earth do you want to do? You must be very clear about that. And at best the people sitting there (students) must be clear, if even they are not clear, then it will finish very quickly... two hours... not much use ...

Among the 12 student responses to the open-ended question about the PBL experience they like the best, most students indicated that group discussion can help them to share with other group members and help them to think more. One student quoted that group discussion can help him to understand the problem but not to totally solve it. Other students stated that PBL instigated them to read, look for reference materials and search for answers, deeper understanding, case study experience, clearer targets, deeper impression of the concepts and more learning opportunities. Only 4 students gave negative impressions of the PBL experience. Among these were the group discussion, the number of formulas involved, the time involved if there are too many formulas; or that discussion cannot be finalized if no standard answer is given for reference.

Cognitive Development

The PBL quantitative results can basically be summarized into three aspects: cognitive development, group learning and expectation. With respect to cognitive development shown in Table 1, around 77% - 84% felt that PBL was a valuable learning experience and PBL helped them to think critically. 78% of them found searching for answers to the learning issues

exciting; 80% felt that PBL was a worthwhile method of learning; and 77% - 80% found reading about the learning issues stimulating. 90% of students felt that the Accounting PBL stimulated their thinking process but only 78% in Statistics PBL shared the same experience.

Table 1
Items Related to Cognitive Development

	Strongly disagree	Disagree	Agree	Strongly agree
PBL is a valuable experience.				
<i>Statistics</i>	1.9%	18.9%	75.5%	3.8%
<i>Accounting</i>	0.0%	16.0%	72.0%	12.0%
PBL helps me to think critically.				
<i>Statistics</i>	1.9%	21.2%	65.4%	11.5%
<i>Accounting</i>	0.0%	15.7%	72.5%	11.8%
Search for answers to the learning issues is exciting.				
<i>Statistics</i>	0.0%	22.6%	67.9%	9.4%
<i>Accounting</i>	0.0%	22.0%	68.0%	10.0%
PBL is a worthwhile method of learning.				
<i>Statistics</i>	0.0%	20.8%	67.9%	11.3%
<i>Accounting</i>	0.0%	20.0%	66.0%	14.0%
PBL stimulates my thinking process.				
<i>Statistics</i>	3.9%	17.6%	64.7%	13.7%
<i>Accounting</i>	2.0%	8.0%	76.0%	14.0%
Reading about the learning issues is stimulating.				
<i>Statistics</i>	1.9%	21.2%	76.9%	0.0%
<i>Accounting</i>	0.0%	20.0%	76.0%	4.0%

Group Learning

With respect to group learning as represented by the items shown in Table 2, over 75% felt that the group interaction was the most valuable part of learning, while about 90% felt that the tutor facilitated the group interactions. 78.9% of Statistics students and 90% of Accounting students felt the group interactions enhanced their learning. 86%-92% found it easy to share their ideas and thoughts in their group, and about 77% felt that students were supportive of each other in their own group.

Table 2
Items Related to Group Learning

	Strongly disagree	Disagree	Agree	Strongly agree
Group interaction in the PBL was the most valuable part of learning.				
<i>Statistics</i>	1.9%	22.6%	71.7%	3.8%
<i>Accounting</i>	2.0%	18.0%	62.0%	18.0%
An active participant in the PBL experience.				
<i>Statistics</i>	0.0%	46.2%	44.2%	9.6%
<i>Accounting</i>	2.0%	30.0%	58.0%	10.0%
Tutor facilitated the group interactions.				
<i>Statistics</i>	1.9%	9.4%	77.4%	11.3%
<i>Accounting</i>	0.0%	10.0%	74.0%	16.0%
Group interactions enhanced my learning.				
<i>Statistics</i>	0.0%	21.2%	65.4%	13.5%
<i>Accounting</i>	0.0%	9.8%	72.5%	17.6%
Felt at ease sharing ideas/thoughts in the group.				
<i>Statistics</i>	0.0%	13.7%	72.5%	13.7%
<i>Accounting</i>	0.0%	7.7%	78.8%	13.5%
Students in my group were supportive of each other.				
<i>Statistics</i>	1.9%	19.2%	61.5%	17.3%
<i>Accounting</i>	2.0%	22.0%	54.0%	22.0%

The students' interview comments reinforced their belief in the spirit of teamwork that is necessary for business graduates to work collaboratively with other colleagues when they have to handle company projects which usually involve more than one team member.

Yes. In fact, this should be inculcated at an early time. When you study MBA in the future, you need to work in a team... As far as I know, this is true.... If you don't do it now, in the future, it is not possible for you to work on project individually. It is just impossible. If we finally have to do it in the future... and moreover these people you are working with may be your future classmates. Maybe a couple of years, say 3 or 4 years. Why not do better at this stage? In fact, in other subjects, you still do it this way... dividing up into groups. I know. But it is not quite effective as some of my friends are taking other courses, say BA (Bachelor of Arts), they never go to group meetings. They just come to listen to lectures... This is what they think... They never do the reading (before tutorials). When it is time to turn in an assignment, they'll ask for leave (from the office) two days before and crack books. The method is just like that... The mode of learning is just like that in Hong Kong. If you want to change... in fact, MBA is a very good process to change. Because you can tell your students that in the future you'll work with this same group of people. And there will be

teamwork. Why don't we try to get used to this now? You have to be able to enjoy the fruit of the group (discussion), the problem now is that there is none. None... of course people will leave. It is for sure.

Group learning also helps students to master better communication skills. Some students may at first be shy to speak up but there are chances for students to voice out their own views even though they may not be totally correct.

The group has its own advantage really...most of the time using case study when working on a project now...it is also another channel to communicate with classmates...perhaps we only care about each other individually if only presented ...with such format... there's discussion in there though some don't say a word at all...or willing to talk... even so getting familiar with each other...the purpose of it that's for you to learn a thing...during the process of discussion somehow you know where you've missed or you have misunderstood...one of the good things is that you can present afterwards after voicing out yours...and you have the guts to communicate with others... perhaps your work doesn't involve communicating with each other... therefore you are afraid of speaking up because you think you lack academic information... when the chance is there... as no one requires you to have a Ph D or so forth...you voice out even you're wrong...it a good channel for communication...I think this is not too bad as a mode of teaching.

Expectation

As far as student expectation about PBL is concerned as shown in Table 3, fewer students (74.5%) in the Statistics discipline would like to have more opportunities for PBL than students (81.7%) in the Accounting discipline. Similarly, less than 60% of the Statistics students preferred the PBL method to the traditional-lecture method whereas 68% of the Accounting students preferred PBL to the traditional-lecture method. About 74% of the students would like to see all the business courses taught in the PBL format.

Table 3
Items Related to Expectation

	Strongly disagree	Disagree	Agree	Strongly agree
Would like to have more opportunities for PBL.				
<i>Statistics</i>	2.0%	23.5%	66.7%	7.8%
<i>Accounting</i>	0.0%	18.4%	73.5%	8.2%
Prefer PBL method rather than traditional-lecture method.				
<i>Statistics</i>	3.8%	36.5%	55.8%	3.8%
<i>Accounting</i>	2.0%	30.0%	62.0%	6.0%
Would like to see all business courses taught in the PBL format.	1.9%	24.5%	69.8%	3.8%

Statistical Analysis

To compare the overall impressions of the PBL experience across disciplines, the scores for questions 1 to 14 were summed up for each discipline. The attitude scale consists of a theoretical score range of 14 to 56 points. As illustrated in Table 4, the PBL scores for Statistics were significantly lower than that for Accounting at the 0.05 level of significance. With respect to any possible gender differences, the female scores for both disciplines were generally higher than their counterparts; however, no significant relationship between the gender and the PBL scores was found in this respect.

Table 4
Descriptive Statistics

	Mean	Standard deviation
Statistics PBL Scores	39.95	4.34
<i>Female</i>	40.71	3.47
<i>Male</i>	39.48	4.80
Accounting PBL Scores	41.78	4.45
<i>Female</i>	42.00	4.04
<i>Male</i>	41.64	4.79

To test any significant difference between the two scores, the paired sampled (Statistics PBL Scores minus Accounting PBL scores) *t* test was applied and a significant difference between the paired scores of the two disciplines ($p < 0.0001$) was found. The students seemed to gain more benefits in Accounting PBL tutorials than in Statistics PBL tutorials.

DISCUSSION

Narrative comments about the best aspects of the PBL experience indicated that group discussion would help them to learn. Most students felt that group interaction not only enhances their learning, enables them to support each other in their own group, and makes sharing easier, but also makes it the most valuable part of learning in the PBL experience. However, nearly half of them consider themselves not active participants in the Statistics PBL experience, and about 30% consider they did not participate actively in the Accounting PBL experience. To some extent, the Statistics discipline was considered new to most of the students. Their lack of understanding about the fundamental concepts is a possible hazard for them to interact actively in the group, and consequently the PBL becomes less effective. Unlike the Accounting discipline, they had demanded a lot of input from the tutor on Statistics and even requested the tutor to hold remedial classes at the students' own cost. Efforts that were made to link up the Quantitative Methods to practical business problems so as to make them interesting were not successful because there was still a want of affinity and the topics in themselves were unpopular (Crombrughe & Pauly, 1995). Should the problem-based activities for Statistics be rewritten to arouse the interest of the students who are particularly weak in numeracy? The statistical report published in newspapers or journal articles is one example that can be possibly used to drive the students to search for the published figures, and hence motivate their learning towards the applied problems at a later stage.

Given the students' qualitative data on the preference of PBL to the traditional-lecture method of instruction, PBL appears to be perceived as unsuitable for the Statistics discipline due to the

existence of abstract concepts that needed to be mastered first before attempting to solve applied problems. The unpredictable ability of the students, their prior knowledge about Statistics, and the time constraints of the available tutorial hours made it hard to implement problem-based activities successfully. Similar to Crombrugghe and Pauly's (1995) findings, without previous exposure to Statistics knowledge it is very difficult for students to circumscribe and analyse problems. It is even much more difficult to motivate and develop a general statistical technique by reference to everyday experience. On the other hand, in the Accounting discipline, the students may have absorbed a mass of worldwide information through the media and acquired related modes of reasoning and some of them are currently working in the field, so it was easier to implement PBL successfully in this discipline. Students also perceived that PBL would be most helpful to them on management topics, even though these were not covered in the course. Although there is little evidence of disciplinary differences in the literature to date and it is yet to be proved, it is likely that PBL will develop quite differently in each discipline.

In summary, the findings from this study suggest several strategies that the course coordinators and tutors can undertake to promote innovative student learning. Course coordinators should reflect on the tutor's reflective reports and student feedback on a regular basis, and engage in discussion about the specific learning outcomes that students should achieve as well as the appropriate levels of learning. While it is difficult to write problem-based activities to suit every student's level, group learning activity which is highly valued by students is believed to be a stepping stone for students who are particularly inferior. Students who prefer a traditional lecture method of instruction can be provided with a high degree of structure and direction by the tutor to help them identify what precisely they want to learn about, why it is important, where they can best find the relevant materials and how these materials are relevant to solving the problem-based activities. By the same token, as PBL requires students to possess self-directed learning skills, the course coordinators should develop these skills to determine what has to be learnt by setting specific objectives; the ability to locate and select appropriate resource materials; skills in designing learning strategies as well as the ability to evaluate learning outcomes.

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