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Application of Problem-based Learning for "Physical Education and Recreation Management" Courses

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Abstract

The purpose of this project was to implement a "Problem-based Learning (PBL)" approach for three undergraduate major courses of the Bachelor of Arts (Honours) in "Physical Education and Recreation Management" programme, with a view to improving students' learning outcomes. For each course, one-third of the class time was allocated to PBL. Students worked on problems as group projects and, under guidance, gathered further information which they used to solve the problems. Then they presented their resolutions in class. One important goal of this project is to conduct formative and summative evaluations of the applications of PBL for the courses, to produce a VCD to illustrate the steps for PBL, to show samples of class presentations as well as video records of students' reactions to PBL. The production and the contents of the VCD are not included in this report.

Key words

Problem-based learning, physical education, recreation management

Introduction

The PBL approach, which has its origins in reforms to medical education at McMaster University in Canada in 1966 (Savin-Baden & Major, 2004), has progressed from the medical field to health-related fields, and later to other professional preparation programmes. At the college level, widespread introduction of PBL curricula took place at the University of Delaware in the late 1990s (Duch, Groh, & Allen, 2001). The PBL approach has been adopted around the world as a philosophy and method for teaching and learning. PBL continues to be used in diverse ways across different subjects and disciplines worldwide (Savin-Baden, 2003).

PBL is a student-centered pedagogical strategy that poses real-world situations and provides resources, guidance, instruction, and opportunities for reflection. The students work with problems in a

manner that fosters reasoning and the application of knowledge (Mauffette, Kandlbinder, & Soucisse, 2004). Walton and Matthews (1989) presented three broad areas of differentiation for PBL to be recognised: essential PBL characteristics that comprised curricula organized around problems rather than disciplines, an integrated curriculum and an emphasis on cognitive skills; conditions that facilitated PBL such as small group tutorial instruction, and active learning; and outcomes that were facilitated by PBL such as the development of skills and motivation, together with the development of the ability to be life-long learners.

Teachers have suggested that the PBL approach has long-term benefits for students including:

developing their problem-solving and self-directed learning skills (Williams, 2001) and making students more self-motivated in their learning (Norman & Schmidt, 2000).

Researchers have reported cases of successful applications in higher education teaching (see review articles, Gijbels, Dochy, Van den Bossche, & Segers, 2005; Tavakol & Reicherter, 2003; Ward & Lee, 2002) and sport science courses (Duncan, Lyons, & Al-Nakeeb, 2007; Jones & Turner, 2006; Martin, West, & Bill, 2008).

Aims and Objectives

The Project Objectives are to:

1. Explore the feasibility of incorporating PBL in two sport science-related courses and a physical education theory course;
2. Determine the degree of students' receptiveness of PBL and the self-directed learning approach;
3. Document whether the PBL approach facilitates learning.

Possible Project Outcomes are:

1. Convenors of the participating courses will be able to assess the effectiveness of using PBL approach in their courses;
2. Positive results from this project will encourage other courses to adopt a PBL approach when appropriate.

With the coordinated effort from the diversified trial courses, the findings of the study will provide valuable information for future modification and improvement of our teaching methods.

Student learning outcomes include:

1. Students will develop independent and critical reasoning thinking abilities;
2. Students will acquire self-directed learning skills;
3. Students will experience different learning and teaching approaches;
4. Students will be more interested and capable in self-directed learning;
5. Students will be more interested in learning.

Methodology

A half-time project assistant was hired to help search for web information and print media about local and overseas programmes to help construct problems relating to the three courses: *Prevention and Care of Sports Injuries*, *Nutrition for Health*

Fitness and *Theory & Practice in Physical Education & Recreation*. The assistant also helped collate information and developed the PBL approaches on a WebCT platform.

Lecturers met regularly to discuss strategies in implementing PBL methods such as lecture-based case, case-based lecture, case method, problem-based etc. For each course, approximately one-third of the class time was allocated to the PBL approach during which group tutorials were held. Students were presented with cases/problems and were guided in their search for further information needed to solve the problems. After the groups developed their initial understanding of the problems, the students were divided up and independently researched the learning issues they previously identified. The learning issues included clarification of the group's learning goals and helping group members work toward a set of shared objectives. These objectives also provided lecturers with a basis to monitor the group's progress and to remind members when they were getting off course, or to ask if they needed to revise their goals. In the problem follow-up phase, the students reconvened to share what they learned and they were asked to reflect on the problem-solving process. Students kept journals to describe and reflect on their learning processes, for example, the difficulties they came across and the strategies they adopted to overcome these difficulties.

For each participating course, one to three lessons were video taped and analyzed by the teaching panel with a view to improving the processes. These videotapes could help students to reflect on their learning processes and help them to learn from each other. As well, the videotapes could become a valuable asset for future users of PBL approach.

Project Evaluation

The progress, the effectiveness, and the efficiency of the PBL approach were monitored and evaluated during the semester and at the end of the semester. The formative evaluations sought to identify teaching and learning problems early in the semester. Individual and focus group interviews and survey questionnaires were used to collect the evaluative data. With feedback from the evaluation, weaknesses were identified and immediate change was made to improve the process to enhance learning. Aspects of evaluation included: students' interest in learning; attainment of knowledge; ability in self-directed learning; strengths and weaknesses of the approach; difficulties experienced by the students and project assistant and their recommendations for improvement; and overall value to the students. This survey format followed those adopted by Catlaw (1999).

At the end of the semester, a summative evaluation was conducted to assess the overall performance of each course using PBL approach. This was achieved by conducting a quantitative survey and independent interviews with students. Findings from these assessments would

indicate whether the adoption of PBL produced the intended outcomes, and whether the course lecturers should continue or discontinue the approach or modify it. The knowledge and experience obtained from this exercise serves to provide useful information for future intended users of the PBL approach.

Results/Findings

Part I:

Application of PBL for "Nutrition for Health Fitness" PERM Course

This was a major elective course. Thirty students enrolled in this course in the 2nd term, 2002-2003. Five topics were identified by students for group project presentations. They were: (1) nutrition for the elderly; (2) nutrition for pregnant women; (3) nutrition for body builders; (4) nutrition for elite athletes; and (5) nutrition for underweight adults. Each group was told to make a presentation for 30 minutes in class in English and their presentations would be video-taped. A project assistant helped with information searching on the web for these specific presentation topics. The information was then put onto WebCT so that students could get access. Students were also told to be creative and interactive in presentations as well as to focus more on the questions and answering session so that all class members could actively participate. A 30-minute class session was allocated for group discussions. The lecturer also gave them ideas to identify their specific problems/ cases.

After the presentations, students filled in the summative evaluation form about PBL being applied in the course. Responses were gauged by 1-5 Likert scale ranging from Strongly Disagree (a score of 1) to Strongly Agree (a score of 5). The followings show the mean values for the responses.

1. This learning style is new to me.
   Mean (SD) 3.42 (.84)
2. This learning style prompts me for higher motivation for self-learning.
   Mean (SD) 4.11 (.46)
3. Lecturer has given me enough background subject knowledge that help me to deal with the subject problem.
   Mean (SD) 3.74 (.56)
4. From the group project process/ presentation, I have obtained useful information.
   Mean (SD) 4.42 (.51)
5. This learning style helps me to communicate better within the group.
   Mean (SD) 4.16 (.77)
6. This learning style makes me learn more about the course than the traditional lecturing style.
   Mean (SD) 4.05 (.62)
7. I learn problem-solving skills from this project.
   Mean (SD)3.79 (.63)
8. Searching on the web is time consuming.
   Mean (SD) 3.47 (1.17)

9. Searching on the web is easier than looking for reference books.
   Mean (SD) 3.58 (.84)
10. This learning style is time-saving.
    Mean (SD) 3.26 (.73)
11. I prefer this learning style than the traditional lecturing learning style.
    Mean (SD) 3.79 (.63)

In the survey, a student was asked to list three strengths or things liked as well as three weaknesses or things disliked about PBL. For dislikes, the student was asked to provide suggestions to help in improving the performance of this learning approach. In terms of strengths about PBL, students indicated that they have:

- Higher motivation for learning;
- Learned problem-solving and self learning skills;
- More opportunities to be trained for organization and presentation skills;
- Become more interested in the course with PBL than traditional learning approach;
- Applied what is being learnt with the case study problems;
- Engaged in interactive learning which is more stimulating;
- Participated in group work and learned to work with others;
- Developed broader thinking framework;
- Obtained more new information;
- Been provided with opportunities to improve their critical thinking skills;
- Been exposed to thought provoking problems;
- Applied information and knowledge in the real world situation.

The main difficulty experienced by most students was the large investment in time for completing the project. In a paradoxical sense, students also felt that as the group project could promote cooperation and they could learn to work with other classmates as well they preferred to have longer time for preparation. A more constructive comment was that content of the group project (Powerpoint slides) could have been discussed with the lecturer so that students felt more confident that they would be able to deliver correct information. Another comment was that they hoped to have more guidelines for conducting the project.

Part 2:
Application of PBL for "Theory & Practice in PE & Recreation" PERM Course

This is a major required course for 1st term, 2nd year students. Thirty-two students enrolled in the class. Students identified an area for group project. They held meetings with group members and had a scheduled meeting with the lecturer for a progress report. Students divided their labor and each was often assigned to review one area of literature about specific theory. Then they discussed approaches to tackle the problem, by either conducting interviews, or distributing surveys, in

which they wrote down discussions in a journal. Then each group gave a 30-minute class presentation in English. A formative evaluation was conducted mid-semester to obtain feedback and suggestions from students and a summative evaluation was conducted upon completion of the project.

In general, about half of the class preferred PBL while the other half preferred traditional teaching and learning approach. It seems that students with better academic standing, more fluency in spoken English and better ability for independent work prefered the PBL approach in learning, while those with poorer spoken English, or non-independent workers, preferred a more traditional teaching and learning approach.

Part 3:
Application of PBL for "Prevention & Care of Sports Injuries" PERM Course

PBL has been shown to be successfully implemented in clinical disciplines of higher education such as medicine, dentistry, nursing, physiotherapy, and occupational therapy. In this project, PBL was tested for a sport science course, which is a major required course for 2nd term of 2nd year students. Students were taught to apply the steps of a systematic approach in evaluating cases of sport injuries. The steps were to ask questions about: (1) patient's past injury history, (2) patient's current injury history – when, where, which body part being injured, and (3) pain site and degree of pain. The next step was to determine the types of injury involved, such as muscles, joint, or soft tissue. The following step was to conduct functional tests specific to the types of injury involved. The last step was to go through a process of elimination, to pinpoint the clinical evaluation of what type of sport injury has occurred.

The lecturer of this course decided to implement PBL for clinical evaluation of sport injury cases during laboratory examination. Before examination, students practiced on examining cases of sport injury. During the evaluation, students randomly picked on a card that specified a type of sport injury. Then students had to follow the systematic steps in clinical evaluation of problem-solving to identify final analysis of type of sport injury sustained. Summative feedback by interviewing students was obtained.

As PBL was applied in examination situations, students felt the time and psychological (being very nervous) pressure in applying systemic steps in evaluation. A few students mentioned about having sudden mind blank due to extreme duress under a face-to-face oral examination situation, of which they had no prior experience.

Discussion

In the survey conducted by *Nutrition for Health Fitness* class, results indicated positive outcomes specifically for four areas (mean score > 4 in 1-5 Likert Scale): (1) obtaining useful information from presentations; (2) helping better communications within the

group; (3) prompting higher motivation for learning; and (4) learning more than traditional method. Positive comments were obtained for the application of PBL in 2 courses: *Nutrition & Health* and *Theory & Practice in PE & Recreation*. Both courses involve class presentation of group projects. The most encouraging feedback was that students felt higher motivations in learning and obtained more information from PBL than from the traditional mode of learning. However, students also gave negative comments about facing much greater workload in completing the group project.

From the taped VCD illustration of segments of group presentation, it was concluded that students did a good job of resolving their problems. All three lecturers agreed that a high quality outcome of learning had been demonstrated by the students.

The implications of this project for future pedagogic practice are:

- PBL can be applied to teaching PERM courses;
- PBL can facilitate students' learning involving case studies and group work;
- More time and guidance should be given to students at the beginning of term for them to prepare for PBL approach of learning;
- Lower weighting of grading on presentations may alleviate students' stress in getting good grade/completing the assignment.

Enhancement on Teaching and Learning

From our experiences in this project, we find a number of advantages in applying PBL in teaching:

- By taking a role of learning facilitator for students, we give students freedom to explore areas of subject matter that hold more interest for them.
- The PBL approach can provide students with real-world cases for analysis, which increases students' intrinsic interest in the course.
- Students have opportunities to be exposed to vast arrays of web information under the facilitation of the course lecturers.
- Students may be reluctant to do group projects at the beginning but they subsequently realize the value and benefits of group projects as they learn about and appreciate the importance of team work in resolving difficult problems.
- Students have increased ability to identify problems related to recreation and physical education.
- Students become more creative in problem solving.
- Some students become more active learners as their self-learning ability and motivation increase. The PBL approach can help students develop their critical thinking and ability to solve problems independently.
- Students have deeper understanding of the theories through the application

of theories to solving real problems related to recreation and physical education. They find that they have learned and understood more through solving problems than from the traditional approach.
- The approach requires students to read more materials and read widely.
- As students have to gather information and materials by themselves, some of them discovered a broader range of knowledge through the exercise which traditional learning might not provide. They also acquired some research skills through the exercise.
- As students are involved in team work, they learn how to build an effective team and they acquire experience in dealing with interpersonal conflicts, improve interpersonal skills and are able to appreciate individual differences.
- As class discussion is an important component in PBL, this can generate more interaction and sharing of ideas amongst students.

From the students' feedback, the following advantages in applying PBL in learning are identified:

- Students take an active role in learning by having higher motivation.
- Students get information and subject knowledge, not from direct instruction, but from information searching, organization and analyzing.
- Students can learn by applying theories to practice in real-world situations.
- When solving problems with a group, students gain experience in sharing ideas and cooperating with others.

Limitations/Difficulties

All three lecturers are receptive to PBL. However, the main limitation is that students have a heavy workload with a schedule of 19 units in a term. Students cannot afford to allocate a larger proportion of learning time for a course that adopts PBL. Although students view PBL as a newer approach which could motivate them to be more independent in learning, some of them may not be willing to invest time and effort to solve problems. In particular, those with poorer study skills and/or low motivation in learning, were generally less confident in adopting the self-learning approach. Another difficulty that students have to face is their proficiency in spoken English. They prefer to deliver presentations in Cantonese.

The following are the difficulties encountered by the students when we implemented PBL for the three courses:

- Some students preferred to learn the knowledge and get the answers to the questions/problems from the teachers and books rather than from an active learning approach.
- Searching for relevant materials and solving problems independently were difficult tasks for some students whose ability was not high.
- Reading articles was a difficult task for some students, in particular for those students with low English proficiency.

They found it difficult to understand the readings but they did not consult their lecturer when they had difficulties.

- More time and effort had to be invested but students thought they did not have the time because of the heavy workload.
- Students were very competitive with each other. They tried to do well even with tasks that carried a small percentage of marks. They spent more time than expected in the assignments and ended up putting a lot of pressure on themselves. They found that the workload was heavy.
- More time was needed than expected for students to complete the tasks independently.
- Some students had difficulties in self-learning. They might need extra attention and guidance from the lecturer. However, they were reluctant to approach the lecturer.
- Some students lacked interpersonal skills and could not handle interpersonal conflicts. They had difficulties in working with (assigned) teams and therefore they were frustrated.

Conclusion

We have achieved a certain degree of success in implementing PBL for two out of three PERM courses. The PBL approach in learning is particularly helpful for students to gain real-life applications for those courses involving theories and practice. We recommend further trial of PBL as a small portion of class time to year-one students in one or two major elective courses (with a smaller class size) and then a subsequent trial when the students move to second and third years. By following the same cohort of students over the years, students may become more receptive to this type of student-centered learning as they become more familiar with PBL. Lastly, lecturers have to be careful in planning the assessment items so as to avoid stressing the students excessively.

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