The attitudes of teacher educators to the use of problem based learning: The video triggers approach

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The approach of problem-based learning (PBL) possesses numerous differences when compared with the conventional ways of learning. However, few of the studies seem to tackle the underlying assumptions of PBL and relate it to the local context when it applies to different groups of learners in a particular discipline, such as education professionals in Hong Kong. This paper will, therefore, analyse the teacher educators' attitudes to the five newly developed video triggers on PBL, which were developed by education professionals at the Hong Kong Institute of Education to serve as exemplars for the teaching staff who are not familiar with the problem-based approach. The study intends to find out the teacher educators' perceptions of the use of media-based educational triggers in this teacher education institute, and what their attitudes are to this particular educational product's potential technological development in fostering student-centred learning in general and problem-based learning in particular, with the ultimate goal of enhancing and improving the quality of teacher training. The results show that pre-requisite training can exert a significant influence on the adoption of PBL by the Chinese teachers and students.

Keywords: Teacher Training, Video Triggers, Problem-based Learning

Background

Problem-based learning versus traditional learning

An extensive search in literature suggests that PBL, when compared with traditional learning, is not to be misinterpreted as being merely about solving problems. To facilitate the learning process, the given problems are always open-ended and complex, and are presented in a context which is personally relevant to simulate real-world experiences (Harper-Marinick & Levine, 2002, pp. 6-7). Its focus is on the whole problem-solving process in which the teacher-facilitators will be able to monitor the effectiveness of the problem, the progress of the learners, and the quality of their products and performances. A contrastive table between problem-based learning and traditional learning should be able to clarify the point:

Table 1: A contrastive table between problem-based and traditional learning

Problem-based learning	Traditional learning
The stress is on the prior knowledge of the learners.	The stress is on the lecturer's knowledge and presentation skill.
Learning is student-centred and tends to promote deep-learning.	Learning is teacher-centred and may, thus, lead to shallow and passive learning.
Knowledge is obtained through collaborative teamwork in the problem-solving process.	Knowledge is generally text-based.
Knowledge is constructed independently by the students themselves using authentic cases as examples with the teachers acting as facilitators	Knowledge is generally obtained in the traditional classroom with the teachers lecturing to the students. Examples are given as symbolic reasoning.
Problems serve as a stimulus for learning and for the development of problem-solving skills in an authentic way. There is no single right answer.	Lectures serve as the main if not the only vehicles for learning. Concepts and information tend to be pre-digested and presented to the learners as truths with symbolic reasoning.

Attributes of video technology

From the teachers' point of view, multimedia can act as a catalyst for enhancing the teaching and learning process. They can easily transform themselves to become part of the learning paradigm where students interact with the new technology and enjoy the learning process. In return, it is expected to have improved results in grades and decreased absenteeism. From the learners' point of view, multimedia can provide them with the opportunity to exercise their own control over their learning. They are given the flexibility to set their own pace of instruction and work through the content at a rate commensurate with their ability and motivation (Williams, 2000). One of the implications is the need to embed learning into authentic and meaningful contexts (Brown, Collins, & Duguid, 1989). Information Technology is considered to be effective in the process of developing higher-order thinking skills, including defining problems, judging information, solving the problems, and drawing appropriate conclusion and solutions (Rice & Wilson, 1999). Another important implication of constructivism for the construction of technology-supported learning environments is that learning is a personal, as well as a social activity. The integration of technology into the learning process can have profound consequences for how learning takes place socially. On one side, one can see even more individual learning in a student using the computer. On the other side, the technology allows for much more diversified and socially rich learning contexts, for example, peer tutoring via computer; computer networks and email. Increased recognition of the potentials of computer-mediated communications and computer-supported collaboration work have enabled building of the more supportive, collaborative, and social learning environments called for by the constructivist perspective.

Development of five video-rich educational triggers

When compared to paper-based learning, the video-based learning has many advantages because it offers a far greater degree of authenticity by allowing teachers and student teachers to observe other teachers on video, and listen to student interactions. Media-rich educational courseware in the form of video-cases comprising the visual elements of posture, proxemics, eye contact, facial expression and uses of gesture may offer a means of engaging authentically the student within the PBL case. It is particularly helpful in the early stages of implementing PBL with novice PBL students. Moreover, the combination of visual clues plus an effective and systematic exploitation of well-selected video sequences can help increase students' interest and serve as a stimulus for free discussion in group work (Bouthillier & Dilanni, 2001). When compared with the equivalent text, a video presentation is particularly helpful for PBL learning format as has been proven by the comparison study on medical postgraduates made by Balslev, de Grave, Muijtjens and Scherpbier (2005). The results indicate an improvement in data exploration, theory building and theory evaluation. Furthermore, video can present authentic data. Historically, students in university teacher-training programmes had always thought that their preparation for classroom management seemed appropriate, until the first day of real teaching when they suddenly realised that their hands-on application of theory was far from adequate (Matus, 1999).

In view of these advantages, within the teacher education sector, integrating technology into the PBL pedagogy has the potential to enrich teaching and learning across the curriculum; multimedia-triggers for PBL may provide authentic scenarios in assisting educators in their training of pre-service teachers. The development of multimedia educational triggers on PBL is expected to contribute further to the desired teaching and learning activities in a significant way. To achieve this end in our present-day context, technology as well as human resources plays an overriding role. Five sets of video-rich triggers listed below were thus developed by the teacher educators particularly for this purpose. The following table gives a brief description of their titles and their respective foci:

Table 2: A brief description of the five cases of media-rich educational triggers (Keppell, 2006, p. 232)

Case	Title	Focus	Resources
One	"What's wrong with my baby boy?"	Early childhood education	Four video-triggers
Two	"Quantum leap"	Exercise physiology - physical education	Six video-triggers
Three	"Why can't i save this file?"	Digital video production	Seven video-triggers
Four	"Just one more minor change…"	Project management in educational technology	Seven video-triggers
Five	"Do you want to play as well…?"	Inclusive physical education	Seven video-triggers

Research questions

To achieve the primary aim of our investigation, the first major question we pose is "how do different groups of users respond to particular media-rich triggers for problem-based learning?" The research objectives are, thus, focused upon the specific area of the users' attitudes to the PBL video triggers, specifically on i) the experience of the teacher educators when using multimedia technology and PBL pedagogy; ii) their perceived difficulties in the process; and iii) the possibility of the video-rich triggers being adjusted to suit better their needs and encourage a wider usage on the HKIEd campus.

Methodologies

For this study of evaluating the innovative PBL video triggers, face-to-face personal interviews were considered to be the most effective tool to tap the thoughts and ideas of these teacher educators with regard to their attitudes towards the video-triggered PBL learning. The semi-structured nature of these expert- and peer- interviews allowed interviewees to pursue any area of inquiry they feel/felt strongly about. The problems discussed include the attributes of these innovative media triggers, their perceived effectiveness, the interrelationships between the material developed and other components of a discipline, and possible future developments of these triggers as learning objects. Although it is sometimes considered to be subjective in nature (Shankar & Goulding, 2001), the open-ended approach encourages respondents to draw their own conclusions from their experiences and/or opinions. Representatives of the teacher informants, and the reasons for inviting them to participate in this study, are given in the following table (Table 3):

Table 3: Representatives of the major stakeholders

Category	Representatives of the Major Stakeholders (Rationale for interviewing them)	Number of Interviewees (n=10)
i	Senior Management (person-in-charge of curriculum and quality assurance)	1
ii	Instructional Designer (person-in-charge of the production team for the 5 video triggers)	1
iii	Multimedia Designer (key member of the production team)	1
iv	Five teachers (5 subject experts whose specialities are related to the 5 video triggers)	5
v	Two Visiting Academics (one expert in teaching methods and one expert in education technology)	2
Total number of respondents		10

Data Source

Ten education professionals who served as the representatives of the major stakeholders participated in the in-depth personal interviews according to the semi-structured questionnaires. The following table (Table 4) provides some brief information about the background of these teacher participants:

More information on the respective background of the teacher participants is given in Table 5. A majority (60%) of these interviewees were Hong Kong-Chinese and 70% of them were male. A very high percentage (70%) of these teacher educators was very experienced with more than 11 years of teaching. Over 60% of them had been working in the Institute for over ten years. It was crucial to note that all the expatriates (4 persons) reported that they had experience in using PBL but four out of the six local Chinese teachers reported that they had very little experience with PBL. This could be explained that, during the past few years, more and more senior academics who were familiar with the global trend of curriculum reform, knowledgeable in applying modern pedagogies, and were experienced in the use of the PBL approach were recruited from overseas. Four expatriates (40%) were using the problem-solving approach whereas the remaining six local educators were either using the problem-based (30%) or problem-oriented (30%) approach. Ninety percentage of these teachers reported they that had high to medium involvement of the Blackboard elearning management system in their daily teaching and learning activities.

Table 4: Teaching experience of teacher participants

Category	Category	No.	%
National origin	Local teachers	6	60
	Expatriates	4	40
Gender	Females	3	30
	Males	7	70
Years of teaching	1-5	1	10
	6-10	2	20
	11-15	3	30
	16-20	4	40
Years at this Institute	Nil	2	20
	1-5	1	10
	6-10	1	10
	11-15	3	30
	16-20	3	30
Years of experience with Blackboard Learning Management System (LMS)	Nil	0	0
	1-5	4	40
	6-10	1	10
	11-15	3	30
	16-20	2	20
Years of experience with PBL pedagogy	Nil	0	0
	1-5	4	40
	6-10	2	20
	11-15	2	20
	16-20	2	20

Findings

Perceptions of the use of five video-rich educational triggers

The teacher participants unanimously expressed the view that the technical complexity of the videos was of a very high standard and that they were equally impressed by the authenticity of the cases presented in the videos.

One of the teacher interviewees commented that, "...the media triggers are really rich resources, because in the short videos of 15 to 30 minutes, there are so many layers of understanding that the learners can achieve. In the videos, students can examine what is the nature of problem, what is the dynamic that the figures bring to the problem, what are the possible ideas that can help to solve the problems."

Most of the teacher respondents were of the favourable view that "…using video in teaching was good because it helped students put themselves into the situation easily. It could also make the teaching more attractive, and it was more useful than using a lot of words." However, he commented also that extensive training would be required for those teachers with no technological background to develop their own multimedia teaching materials.

Some of the teacher participants commented further that using video triggers was a good way to introduce students to the concepts, the difficulties and the complexities that they would face in real teaching and learning situations. This was especially true in cases where the teachers did not have the facilities to take the students into the school to meet with the counsellors, in-service teachers who had real experiences, or other related people. There might also be the issues of confidentiality, as well as of protecting the students' and parents' rights.

As expressed by one of the interviewees, "...it was meant to get students talking about things. It was also intended to be used in a face-to-face setting, so that students could talk and try to work out the issues. Among these issues there was no right or wrong views but the discussion would help the students to be sensitised to these authentic issues."

Perceptions of the use of PBL approach

With regard to the use of PBL pedagogy in teacher training and the perceived learning benefits of the video triggers, the teacher educators showed considerable interest in whether new capabilities supported

Table 5: Use of Blackboard management system and PBL by teacher participants

Interviewees	Use of the eLearning Blackboard Learning Management System (LMS) (Low/Medium/High Usage)	Use of Problem-oriented/ Problem-based/ Problem-solving approach	Year in HKIEd	Year of Teach -ing
Senior Management (Local/Male)	**Medium usage** Use of Blackboard LMS in the past when he had teaching duties Years of Experience:1-5	**Problem-oriented approach** being applied in his teaching previously Years of Experience:1-5	11-15	6-10
Instructional Designer (Male/ Expatriate)	**High usage** In-charge of the Institute's Blackboard LMS eLearning system Years of Experience:11-15	**Problem-solving approach** being applied in his teaching and research projects Years of Experience:11-15	11-15	11-15
Multimedia Designer (Local/Male)	**High usage** Use of Blackboard LMS to upload projects and tasks for sharing with the project team members Years of Experience:11-15	**Problem-based approach** for solving multimedia design and production problems Years of Experience:6-10	6-10	6-10
Design & Technology (Local/Male)	**High usage** Use of computer and software for design and graphics teaching. Years of Experience:1-5	**Problem-based approach** for teaching design with the use of computer. Years of Experience:1-5	1-5	1-5
Information & Applied Technology (Male/ Expatriate)	**High usage** Use of Blackboard LMS for uploading teaching materials and for providing a discussion forum for students Years of Experience:6-10	**Problem-solving approach** for teaching IT and technology Years of Experience:6-10	11-15	11-15
Adapted Physical Education (Local/Male)	**Medium usage** Use of Blackboard LMS for uploading teaching materials and for providing a discussion forum for students Years of Experience:16-20	**Problem-based approach** for problems related to the teaching of Inclusive physical education. Years of Experience:16-20	16-20	16-20
Business Studies (Female/ Local)	**Medium usage** Use of Blackboard LMS for uploading teaching materials and for providing a discussion forum for students Years of Experience:1-5	**Problem-oriented approach** for solving problems in creating and running the business course. Years of Experience:1-5	16-20	16-20
Chinese Language Teaching (Female/ Local)	**Medium usage** Use of Blackboard LMS for uploading teaching materials and for providing a discussion forum for students Years of Experience:1-5	**Problem-oriented approach** for teaching the Chinese language, grammar, vocabulary, and poetry. Years of Experience:1-5	16-20	16-20
Overseas education professional (Male/ Expatriate)	**Medium usage** Use of Blackboard LMS for uploading teaching materials and for providing a discussion forum for students Years of Experience:16-20	**Problem-solving approach** for running a staff development training programme Years of Experience:16-20	nil	16-20
Overseas education professional (Female/ Expatriate)	**Low usage** Use of Blackboard LMS for uploading teaching materials and for providing a discussion forum for students Years of Experience:11-15	**Problem-solving approach** to be studied in depth in his research work. Years of Experience:11-15	nil	11-15

by multimedia can change what and how people learn. They were all agreeable to the assumption that the six learning outcomes of PBL, namely, i) authentic learning, ii) use of prior knowledge, iii) student-centred learning, iv) collaborative learning, v) independent learning and vi) deep-learning enhancement were all achievable through these newly developed PBL video triggers. By viewing the video episodes, participating teachers could already observe benefits of the PBL approach on their professional training.

Some experienced education professionals stressed that it was the teachers' responsibility to be creative in developing scenarios so that the students would be interested in engaging with the lessons.

One of the teacher educators elaborated that, "…it is a process of developing interactive skills, critical thinking skills, and reflective skills….to become more sophisticated in their learning. The PBL video triggers help develop those skills essential for the students to address their own needs even after they have graduated from the programme."

However, it was crucial to note that a consistently recurring theme in almost all discussions with the educators was their concerns about how much time and effort the PBL pedagogy would require. For example, they were concerned about how to assess the learning outcomes. As Boud and Feletti (1997) maintains, it is not sufficient to have a teaching approach which is problem-based; assessment of students' performance needs to be consonant with the method of teaching.

As an experienced PBL adopter, the overseas academic made some good suggestions, "…in the PBL process, the students are required to develop certain skills or abilities. You could assess those skills or abilities according to different criteria…usually you have to assess both the process and the product in PBL, because the process may be similar but the product or the learning outcomes will be different…there should be criteria for both."

Also, the teacher educators were worried about the steep learning curve during the adaptation to, and implementation of, a new teaching approach. This concern was intensified in the local context where the teaching professionals have a heavy teaching workload. Mastery of a new teaching method could only come with the accumulation of considerable experience and investment of time. While pre-service teachers could master new teaching concepts and ideas relatively easily, the prospect of having to master a new teaching approach could be daunting for some of the teacher trainers, their professional training being obtained in a traditional way in the past. Thus, the teacher trainers expressed their worry that they might end up spending more time on adopting a new pedagogy than on developing the students' subject knowledge to meet the rigid curriculum requirement.

As one of the experienced educators expressed, "…the pure form of PBL as developed in medical education has proved to be a barrier for others wishing to adopt it or certain aspects of it. It is because the medical schools are typically well-resourced, and are able to recruit high achieving and highly motivated students. The medical profession also has a clear professional context in which to develop the curriculum. These are challenges in implementation because the approach needs to be adapted to meet the needs of different students, contexts, disciplines, or professions, and even cultures and countries..."

Suggestions for future enhancement

The opinions obtained from the personal interviews appear to confirm that these video-rich PBL triggers are well received by the teacher educators. By viewing the video episodes as examples, the teacher educators could already appreciate the potential benefits of this approach on professional teacher training. In short, the findings suggest that training is important to be provided to both the teacher trainers and trainees in order to help them understand the potential benefits of PBL pedagogy. However, knowing the benefits of a courseware may not necessarily mean that the teachers will adopt it in the classroom. Regarding the future enhancement to be made, the student teachers suggested that more real-life cases be explored, such as the scenarios of classroom management in local schools, interaction and coordination with other teachers in school, stress and time management in the teaching profession.

One of the teacher educators expressed his views: "The issues that my students are worrying the most about are classroom management and their cooperation with the subject teachers. They are eager to look for some suggested solutions to their daily problems in schools and to find out whom they should talk to when they encounter difficulties at work. Things they struggle with the most are when they have to develop a lesson plan for every lesson of the day. It is not an easy task for a novice teacher. They always wonder whether they should develop the lesson plan or prepare some special teaching materials first."

Recommendations

Almost all of the participants involved in this study believe that certain skills such as managing the PBL process, case analysis and problem identification, solution development and assessment of learning results, as well as techniques in handling the large class size and the group dynamics were prerequisites to success. Their concerns are shared by Harwell and McCampbell (2002) whose study outlines some

major difficulties of PBL for the teacher and they claim that the whole process is more time-consuming than traditional methods because of the reliance on developing the appropriate problem to be solved to ensure success, and the extra effort required in developing an alternative student assessment method.

Training to the teacher trainers

In order to raise the quality of teachers who are regarded as an important key to quality education, special training for teachers is required to restrain them from assuming the role of an authoritative source of knowledge for facilitating the PBL process. Evaluations conducted by Dolmans, Wolfhagen and Snellen-Balendong (1994) on the views of students regarding their tutors' performance have found that i) guidance of students through the learning process, ii) content knowledge input, and iii) commitment to "group learning" are of paramount importance in promoting new teaching methodology. Jones, Donnelly, Nash, Young and Schwartz (1993) refer to the two key roles of a PBL tutor: i) facilitation of the learning process via prompting and ii) assisting in groupwork processing to ensure the learners are on the right track. In a student survey conducted by Zimitat and colleagues (1995), seventy percent of students in a PBL course considered their tutors' roles to be most essential for the success of the learning method. Another study conducted by Gijselaers and Schmidt (1990) identifies a causal relationship between tutor involvement in PBL and group processes, which in turn affects student motivation towards learning.

Training from the teacher trainers

During the PBL process, the teacher trainers can encourage the teacher trainees to form groups and take a team-oriented approach for resolving the problem. According to the interview notes with the teacher trainers and the statistics generated from notes by the NVivo software, it appeared that the majority of the Hong Kong students had limited training in effective group dynamics. This is an alarming issue because PBL is supposed to simulate actual professional practice during a professional preparation programme. Teacher Trainees who do not properly contribute during group-based PBL sessions might not be reliable as future PBL teachers and colleagues. This is especially true when these student teachers become teaching professionals - they will spend much of their time working with groups of people, such as other members of teaching staff, school principals/administrators, government officials and various educational committee members. Developing effective group skills and experience are, therefore, crucial ingredients of PBL training because group work is often a good way to improve communications, impact team learning, and increase acceptance of decisions. An understanding of group dynamics and real experience in working in groups are equally important to the teacher trainees before they enter the profession.

Conclusion

The study intends to probe into how the educators of a teacher education institution responded to a particular educational product, namely, those media-based educational triggers in this case, and what their attitudes are to the latter's potential technological development in fostering student-centred learning in general and problem-based learning in particular. The results show that pre-requisite training can exert a significant influence on the adoption of PBL by the Chinese teachers and students. In addition, the consensus amongst the providers of the feedback seems to suggest that there are a number of problems that need to be addressed if true benefits of switching to PBL in the local education sector are to be reaped. It is hoped that the insights derived from the data should form a valuable baseline for conducting a longitudinal study to determine the extent to which this multimedia educational courseware can affect the processes of learning, as well as to identify the achievable learning outcomes when evaluating the usefulness of video-rich triggers in a teacher-education environment and context.

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