User Acceptance Test of Computer-Assisted Problem-Based Learning Assessment Tool (CAPBLAT)

Muhammad Qomaruddin[*]
Universitas Islam Sultan Agung, Indonesia

Azizah Abdul Rahman[**]
Universiti Teknologi Malaysia, Malaysia

Noorminshah A.Iahad[***]
Universiti Teknologi Malaysia, Malaysia

Abstrak

Pembelajaran Berbasis masalah (PBL) merupakan metode desain instruksional yang digunakan oleh banyak dosen untuk membuat pengalaman belajar lebih efisien dan bermakna. PBL menekankan dosen untuk memfasilitasi pembelajaran kolaboratif. Mereka secara konvensional memainkan peran kecil dalam proses penilaian secara formal. Peer-assessment dan self-assessment adalah metode yang paling sering digunakan oleh dosen dalam penilaian di PBL. Makalah ini menyajikan penerimaan pengujian terhadap alat berbasis komputer untuk peer-assessment dan self-assessment dalam metode pendekatan PBL, yang disebut Alat bantu Komputer untuk Pembelajaran Berbasis Masalah (CAPBLAT). Dimana alat ini dirancang untuk membantu dosen melakukan pengajaran dengan metode PBL dan membantu menilai mahasiswa dalam proses belajarnya. Sebanyak empat puluh mahasiswa berpartisipasi dalam uji alat ini. Selama penelitian, kuesioner diberikan kepada mahasiswa. Hasil mengenai penerimaan alat penilaian menunjukkan bahwa menggunakan CAPBLAT dalam proses penilaian PBL mendapat penerimaan yang lebih baik dari dosen maupun dari mahasiswa.

Kata kunci: *peer-assessment, self-assessment, Assessment, Problem-Based Learning*

Abstract

Problem-based Learning (PBL) is an instructional design method that is used by many lecturers to create more efficient and meaningful learning experiences. PBL places an emphasis on assisting the lecturers in facilitating collaborative learning. They conventionally play a small role in the formal assessment process. Peer-assessment and self-assessment are the most frequent methods of assessment employed by lecturers when conducting PBL. This paper presents a user acceptance test of a computer-based tool for peer-assessment and self-assessment in PBL, known as Computer-Assisted Problem-Based Learning Assessment Tool (CAPBLAT). The tool was designed to assist lecturers in conducting the PBL teaching method and assess students' learning progress. A total of forty students participated in the testing of the tool. During the study, questionnaires were administered to students. The results concerning the assessment tool acceptance demonstrate that students showed positive feedback and accepted the usage of CAPBLAT for the PBL assessment process.
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Keywords: *peer-assessment, self-assessment, Assessment, Problem-Based Learning*

[*]Muhammad Qomaruddin, Department of Informatics Engineering, Faculty of Industrial Technology, Universitas Sultan Agung (unissula), Semarang – Indonesia.
E-mail: *mqomaruddin@unissula.ac.id*

[**]Azizah Abdul Rahman, Department of Information Systems, Faculty of Computing, Universiti Teknologi Malaysia, Malaysia
E-mail: *azizahar@utm.my*

[***]Noorminshah A.Iahad, Department of Information Systems, Faculty of Computing, Universiti Teknologi Malaysia, Malaysia
E-mail: *minshah@utm.my*

Introduction

Teaching and learning in the PBL approach differ from the traditional approaches. PBL encourages students to be, specifically: active learners, self-directed learners and work together in a group. It enables various methods of assessing students, including, for example: assessing the outcomes of the PBL (such as a group project report) and assessing the performance of an individual student. The most frequently used assessments in PBL are self-assessment and peer-assessment.

There are many advantages to be gained by utilizing self-assessment and peer-assessment. Through self-assessment and peer-assessment, students are able to make judgments about how well they have learned; rather than merely how much they have learned (Macdonald & Savin-Baden, 2004). Peer-assessment helps to develop the acquisition of self-directed learning skills as students participate in the assessment experience (Ballantyne, Hughes, & Mylonas, 2002). In addition, self-assessment and peer-assessment provide valuable insights into the performance of students. It has been demonstrated that peer ratings are a good predictor of future performance, and provide information regarding student performance that is not measured by other traditional evaluation methods (Foreman, 2007; Sullivan, Hitchcock, & Dunnington, 1999).

Strong support for self-assessment and peer-assessment is proven throughout literature studies; however, difficulties have also been reported. Both types of assessments are time-consuming and thus are regarded negatively by students. Students need to undertake the peer assessment more anonymously and it is very difficult to assess peers within the confines of the PBL room (Papinczak, Young, & Groves, 2006).

The use of computers in assessment in general is known as a definition of "Computer-Assisted Assessment (CAA)". Through this, CAA can provide advantages for both lecturers and students to provide them with detailed formative feedback for their learning achievements compared to conventional assessment. It also can reduce the somewhat tedious load of lectures by automating parts of the task of marking students' work. Accordingly, the student receives an instant and objective score together with specific and timely feedback. This is due to the detailed scoring data already being digitized and recorded to central repositories in the students' records system (Bull & Danson, 2004).

This paper proposes an automated tool for PBL assessment by which to accomplish these difficulties by utilising computers. In today's high technology environment, computers can play an enormous role in the assessment process; in this case especially for peer-assessment and self-assessment respectively. The paper will also discuss the acceptance test of the tool as received from the students.

CAPBLAT as Assessment Learning Tool

CAPBLAT (abbreviation for Computer-Assisted Problem-Based Learning Assessment Tool) is a computer-based assessment tool designed for assessing students' progress in a Problem-Based Learning (PBL) approach.

CAPBLAT serves the purpose of helping lecturers assess their students' learning achievement in the PBL approach. Moreover, CAPBLAT can also assist students to, specifically: assess their peers' contributions, assess their own performances and monitor their individual learning achievement.

The CAPBLAT method was developed based on the framework of PBL assessment, named PBLAsF (Problem-Based Learning Assessment Framework). This consists of seven instruments of assessment methods, namely: 1) Peer-Assessment, 2) Self-Assessment 3) Individual-Activity Assessment,   4) Group-Report Assessment, 5) Group-Presentation Assessment, 6) Pre-test and 7) Post-test/Final-test.

During the PBL session, all students are required to enter the login information to the tool. At this point, they should insert a valid e-mail address and secret password for their sign in to the CAPBLAT. Figure 1 shows the CAPBLAT login page screenshots.

The CAPBLAT performs numerous learning functions, including: providing learning material, assessment rubrics, displaying results and feedback, facilitating the creation of a PBL session, a publishing problem, generating group members, activating assessment and sending notification to the students.

Among those features, this paper has only concentrated on reporting the utilization of CAPBLAT for peer-assessment and self-assessment. Accordingly, during the research, students were asked to use only two features of CAPBLAT, namely: peer-assessment tool and self-assessment tool.

In order to achieve the outcome (the course objectives and PBL objectives), identification of criteria for each PBL objective was required (Montemayor, 2004). The research defines process skills and scope of criteria for each of the objectives as outlined in Table 1. The four process skills, specifically: 'Knowledge building, knowledge work, communication, as well as critical analysis and

problem solving' have been determined based on the process skills commonly used by the PBL practitioners who founded the literature studies.

The CAPBLAT also provided these process skills as described in Figure 1.

Table 1. The defined proces skills and scope of criteria.

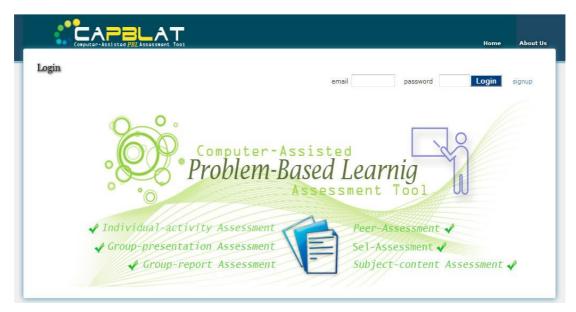| No	Process Skills to be assessed	Scope of Criteria
1	Knowledge building	- Application of Knowledge Base
		- Self-directed learning (self-study)
		- Demonstration of breadth and depth of knowledge
2	Collaborative work	- Self-contribution (Team member contribution)
		- Cooperation among team members
		- Responsibility to team members
		- Punctuality and Positive Influence
		- Responsibility and commitment in all the team's tasks
3	Communication skills	- Attitude during discussion and professionalism
		- Ability to communicate ideas clearly
		- Being able to accept feedback with openness
		- Positive reaction to feedback and criticism
4	Critical analysis and Problem solving	- Critical analysis, reasoning and decision-making skills
		- Provision of input which focuses on and is relevant to the case
		- Self-awareness: Ability to accept and respond to criticism gracefully

Figure 1. CAPBLAT Login Screenshots.

Research Method

The research was carried out in classrooms at the Universiti Teknologi Malaysia. A total of 40 students participated in this study, and they were divided into two classes (Class A for Theory of Motivation and Class B for Behavior Disorder) and several groups. Each group consisted of four or five members. All students involved were registered in the second semester, and this activity was their first attempt in PBL learning and using a computer-based assessment tool for their peer-assessment and self-assessment. Quantitative analysis was then used to evaluate student technology (assessment tool) acceptance.

Procedure

Before the commencement of the PBL class, an introduction of PBL was given to the students. We also hosted a presentation of the use of CAPBLAT for the students, by means of a demonstration in the classroom.
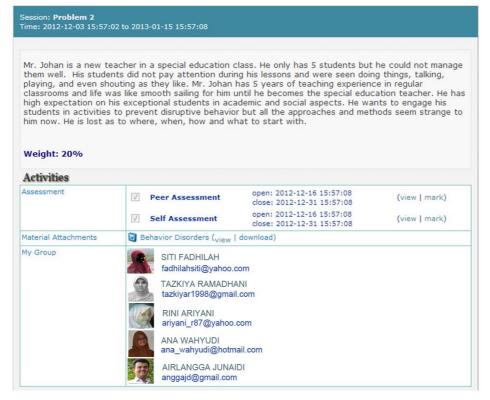
Figure 2. Student page designed to view problems, assessments and group member screenshots.

During the PBL session of the semester, students presented three problems as a trigger for their work tasks in their respective groups (please refer to Figure 2 for examples of the problems). Each group member was encouraged to share and discuss their work on the dedicated forum that has been provided during the program. At the end of each problem, students were required to assess the online form for their peers and their own performance. It is anticipated that these assessments would contribute 5% of the overall percentage of the course assessment. The peer-assessment and self-assessment form consists of four process skills as depicted in Figures 3 and 4.

Each process skill consists of three or four criteria that have been adapted from Montemayor (Montemayor, 2004), and Uden & Beamount (Uden & Beaumont, 2006). For each criteria of question, students are required to assess their peers based on the four rating scale. This ranges from, namely: 1-Poor, 2-Fair, 3-Good and 4-Excellent. Students have been reminded to make a fair judgment of their peers based on each of the peer contributions.

Data Collection

A quantitative method was used to collect the data, which had been gathered via a questionnaire. The questionnaire was administered to students for the purposes of examining technology acceptance based on Technology Acceptance Model (TAM) by Davis (Davis, Bagozzi, & Warshaw, 1989).
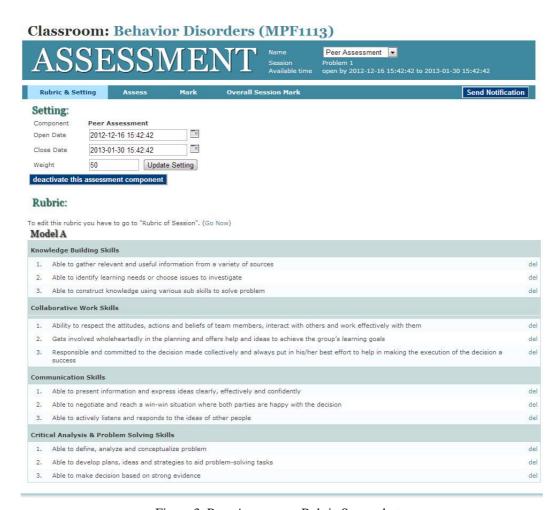
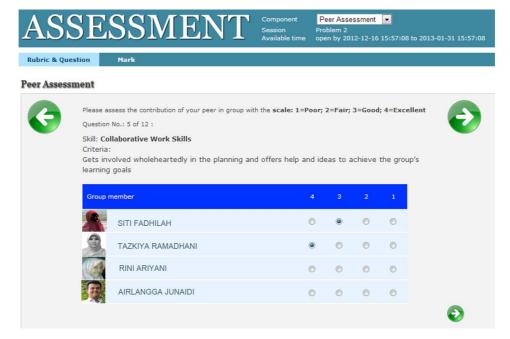Figure 3. Peer-Assessment Rubric Screenshots.

Figure 4. Peer-Assessment Screenshots.

Questions posed in the questionnaire were divided into two parts. In Part A, the questions were determined based on three factors, namely: Perceived Usefulness (PU), Perceived Ease of Use (PEU), and Attitude Towards Usage (ATU) with a total of 11 questions, as listed in Table 2. The 5-point Likert scale from 5 for "strongly agree" to 1 for "strongly disagree" was used for the questions in Part A. Meanwhile, Part B consists of open-ended questions in which students are invited to provide comments and suggestions concerning the tool.

Result and Discussion

The result (Table 2) shows that scores for each question of PU, PEU and ATU are all (mean) above 3,9 respectively. They range between "Agree" and "Strongly Agree". The students generally agreed that CAPBLAT is useful, easy to use, and they have a positive attitude toward using it.

Table 2. The Questionnaire Questions

Factor	Question
Perceived Usefulness (PU)	
Q1	The tool provides a comprehensive framework for PBL assessment which can be used effectively to assess students' performance.
Q2	The tool is effective in assisting lecturers to assess their students by the PBL Method.
Q3	The tool helps lecturers save time in marking.
Q4	The tool is able to overcome the complexity and tediousness of the PBL assessment.
Q5	The tool effectively monitors student progress through more frequent assessments
Q6	The tool provides quick and specific feedback to students during problem sessions.
Perceived Ease Of Use (PEU)	
Q7	The tool is easy to use.
Q8	It's easy to understand the contents of the tool.
Q9	The whole tool is well-developed & user friendly.
Attitude Towards Usage (ATU)	
Q10	I like to use the application because it is easy and it is also quick to find and access information concerning assessment.
Q11	I hope the application can provide more features for assessment and learning, so that other learning methods can also use it.

Table 3. Statistics of Questionnaire Questions

Question	Percentage (%)					Mean
	SD	DA	N	A	SA	
PU						
Q1	0	0	5	57,5	37,5	4,33
Q2	0	0	7,5	42,5	50	4,33
Q3	0	5	10	32,5	52,5	4,33
Q4	0	2,5	20	55	22,5	3,98
Q5	0	2,5	20	55	22,5	4,35
Q6	0	2,5	20	55	22,5	4,45
PEU						
Q7	2,5	0	0	60	37,5	4,30
Q8	0	2,5	10	55	32,5	4,18
Q9	0	0	10	40	50	4,40
ATU						
Q10	0	2,5	15	45	37,5	4,18
Q11	0	2,5	20	55	22,5	4,20

1=SD: Strongly disagree, 2=DA: Disagree, 3=N: Neutral, 4=A: Agree, 5=SA: Strongly agree

Responses to question Q1 indicated that 95 % of students were in agreement that the tool provides a comprehensive framework for PBL assessment by which to efficiently assess students' performances; while just 5% of them indicated a neutral position to this question. Responses to Q2 indicated that 92. 5% of students showed their agreement that the tool is effective in assisting lecturers to assess their students by the PBL Method; while only 7.5% of them were shown as having a neutral attitude to this question. Regarding responses from other questions in factor PU (Q3-Q6), more than 75 % of students showed their agreement, while the remainder chose neutral and disagreement stances.

According to the results of open-ended questions, it can be seen that most of the students gave positive comments on their experiences with using the tool. Some of the comments included: "the system is good and accessible. It is user-friendly and gives students continuous feedback on their progress throughout the course. Assessment is more reliable because each student was assessed by the lecturer, peers and even themselves".

Conclusion

In this study, a computer-based tool for PBL assessment (CAPBLAT) was developed. The tool has been designed to assist the lecturer conduct the PBL teaching process and assess their students' learning progress accordingly. The study involved students using the CAPBLAT for the purpose of, specifically: reading the problem trigger, checking their progress, and assessing the online form for their peers and their own performance respectively.

Reflecting upon the case study, the answers to the questionnaire as provided by the students showed very positive feedback on the use of the tool. The students were in agreement that CAPBLAT is useful, easy to use, and they displayed a positive attitude towards using it.

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