Συνέδρια της Ελληνικής Επιστημονικής Ένωσης Τεχνολογιών Πληροφορίας & Επικοινωνιών στην Εκπαίδευση

Τόμ. 1 (2012)

8ο Πανελλήνιο Συνέδριο ΕΤΠΕ

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Βιβλιογραφική αναφορά:

Onan, A., Turan, S., & Elçin, M. (2022). Reinforcement of Student Studies in Problem-Based Learning through Case-Based E-Learning Application. *Συνέδρια της Ελληνικής Επιστημονικής Ένωσης Τεχνολογιών Πληροφορίας & Επικοινωνιών στην Εκπαίδευση*, *1*, 344–347. ανακτήθηκε από https://eproceedings.epublishing.ekt.gr/index.php/cetpe/article/view/4644

Reinforcement of Student Studies in Problem-Based Learning through Case-Based E-Learning Application

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Summary:

Providing attunement to learning outputs generated as a result of Problem-Based Learning (PBL) activities with specified criteria cannot be always possible. Among student feedbacks, complaints regarding tackling issue, asking appropriate questions, quality of given answers and the amount of interests are being observed.
In this study, case-based examples have been used in order to strengthen students' self-directed skills after PBL. Questions developed reflect expert's viewpoint. Students have been provided an opportunity to compare their own approach with that of expert's.
An e-Learning application has been added to the regularly performed PBL activity in the program. Comments of students regarding the application have been taken through feedbacks obtained electronically.
Findings show that the e-learning application could be an effective tool in developing and evaluating of PBL activities.

Keywords: Problem Based Learning, E-Learning

Introduction:

Problem-Based Learning is one the approaches preferred in eliminating negative points of education applications such as dissatisfaction of students towards education, non-associability of learned knowledge with professional practice, students' inability of using their knowledge in solving the problems encountered in practice field, and (weakness) in their reasoning (Hmelo-Silver, 2004).
The purpose of PBL is to bring students in the skills of self-directed collaborative learning, independent study, questioning, clinical reasoning, effective problem solving, as well as increasing motivation towards learning (Mauffette, Kandlbinder & Soucisse, 2004), and forming a comprehensive and flexible knowledge basis.
In PBL sessions, method of "teaching through small groups" is being applied, in which development of general skills and attitudes and joint knowledge acquisition are being merged, and learning needs are decided collaboratively. Basic components of PBL are problem and scenario, student, tutor, environment and evaluation.

Problem and Scenario: In PBL, learning process begins with a problem comprising acceptable level of complexity reflecting real life (Mauffette et al., 2004). Discussion activities regarding the problem are being performed before sharing syllabus information with students.

Students: PBL is a student-based process. Students, on the basis of self-directed learning, establish verbal, professional and open communication, evaluate the current information by

analysing the problem, understand the problem, decide on information to be used in explaining and solving the problem, and to develop subsequent learning activities (Dolmans & Wolfhagen, 2005). Students are expected to reach the required literature information in order to develop a better understanding towards the problem (Schmidt, van der Arend, Moust, Kokx & Boon, 1993). Students learn to eliminate inconsistencies in the findings they reached by explicit compromise.
Tutor: Tutor supports the process, encourages discussions, presents related content information when required, and evaluates progress and development. He/she observes the level of contribution of each group member, ensures the overlapping of learning targets and learning outputs (Maudsley, 1999; Bud´e, van de Wiel, Imbos, & Berger, 2011).

Learning Environment: Students can organize activities based on active learning, collaborative study and problem, searching, data collection, analysing, reflecting and presenting experience (Savin-Baden, 2003), and use authentic evaluation techniques in their learning environment.

Evaluation: Evaluation plays a crucial role in supporting permanence and transfer of knowledge, and in securing development of utilization of knowledge and skills. It gives information regarding conformity of learning outputs with learning targets; provides practitioners an opportunity to understand the extent to which a student developed cognitive and functional understanding regarding education subject, to intervene where necessary. For this reason, usage of multidimensional evaluations is being suggested in PBL (Macdonald & Savin-Baden, 2004).

Situation of Problem:

In PBL, there are some difficulties for tutors to conduct the learning activities in the same quality. In each of the groups, group dynamic progresses with different courses and learning levels are being reached at different levels (Applin, Williams, Day & Buro, 2011). Sharing with students the determined learning targets in the program at the end of activity is not sufficient in overcoming this problem.
In recent years, electronic sources are being used frequently in providing and supporting learning and such tendency is being expected to increase (King et al., 2010). Studies are being made in which PBL is being supported with networked learning approach, is being conducted in combination or electronically in order to obtain effective student participation, time and resource utilization. In these applications, tutor's load increases especially in designing teaching, while his remaining duties continue.

Method and Application:

Department of Medical Education and Information of Medical Faculty has proposed that sharing expert's approach with students and students' comparing their own solutions with that of expert's would be beneficial. For this purpose, it has been decided to use formative evaluation solutions (Hudson & Bristow, 2006) which will provide students opportunity to acquire knowledge regarding their own development (Stepien & Gallagher, 1993).
Since the relevant literature suggests that usage of open-ended questions would be acceptable in explaining causative mechanisms underlying the problem, new facts comprising PBL's learning targets and evaluation questions have been developed.

Students have been provided access to the developed new facts and questions in compliance with the e-learning approach. For this purpose, an open-source coded learning management system program named "Moodle" has been used. Student profiles have been created and relevant access information and instructions have been shared with students.
Usage of e-learning application has been enabled before the summative evaluation of the PBL activity realized in March 2012.
Students found opportunity to give open-ended answers to the questions throughout a week. At the end of the application, all possible answers have been shared with students by closing data entry. Students have been asked to compare their answers with those of expert's, and evaluate their own learning.
Evaluation questions have been responded by 354 students out of 398 Semester 1 students participated in e-learning application. Students' comments regarding the application have been obtained by means of answers given to questions, two of which were open-ended and four of which were "5 point likert scale" type.
Answers given to open-ended questions have been evaluated and reported by means of descriptive analysis.

Findings:

Table 1. Application-Oriented Proposals and Their Rates

Proposal	**Rate**
Evaluation questions and answers have facilitated my learning of learning targets.	**4,38**
Evaluation questions caused me to reflect upon the problem.	**4,18**
Usage of the program, in which evaluation questions were presented after PBL, was easy.	**4,23**
I think that evaluation questions and answers in the internet environment have supplemented the PBL activity.	**4,17**

Findings in Table 1 show that students presented positive opinion in higher 20% segment to the proposals regarding application.
When the answers given to open-ended questions have been examined, it has been found out that the application could be an effective instrument in developing and evaluating PBL activities. Some examples of students' opinions are given here below:
Student A – "I found this application positive. Interactive environment was favourable."
Student B – "This activity was remarkably pleasant. First, while responding the questions, I found out on which subjects I have deficiencies, and responded the question by going deep into the knowledge. Presentation of answers of the questions has become even better, because I realized that I interpreted some information that I read while searching the subjects differently. In short, this application was extremely helpful for me to understand better of the subject."
Student C – "It has fortified what I learned in the lectures, and I learned even more, it is obviously a truly useful system and I hope that it would apply to other lectures. If I give 10 points to the efficiency of lectures given in lecture hall, I would definitely give 100 points to the efficiency of PBL lecture."
It has also been found out that contrary opinions of students were not stemming from the new application, and largely stemmed from method of PBL application.

Discussion and Result:

This study is limited with the working group due to its "qualitative" nature. Students' opinions indicate that additional target-driven learning facilities provided in the electronic environment contribute to their learning. In this context, it is being projected that similar studies to be conducted in different study groups, different searching techniques and different time intervals could be useful.

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