

e-PBL Teaching Model for an Efficient Computer Education

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Abstract. In this paper, e-PBL teaching model for information literacy education of computer in elementary schools is developed. e-PBL computer teaching model is identified to be effective for learners to improve the ICT literacy. The on/off-line based Blend teaching model is designed to improve creativity and ability of self-leading. As an effective e-PBL teaching, the learning support system including e-Mentoring and web-discussion ought to be built together. For the successful e-PBL teaching in elementary education of computer, the learning system that has the various learning strategies and support systems which interacts teachers with learners frequently is developed.

Keywords: PBL, e-Mentoring, learning system

1 Introduction

A dramatic development in the Information and Communication Technology (ICT) has rapidly increased the extent of new information and knowledge and made a solid information based society. Now, the ability to acquire and utilize Information and Communication Technology has become a survival strategy beyond personal development. Due to such a paradigm change, the conventional teaching and learning method, which simply aims at the delivery and acquisition of knowledge, has become inappropriate to increase the self-directed problem solving ability required in daily life. The ability to use studied contents to solve daily life problems has been increased to improve self-directed adaptability in the real world. This agrees with an argument of Guzdial, who said “Since the variety of abilities required in the information society cannot be separated from actual circumstances, education must be accomplished in that circumstance” [1].

Under such direction, a Problem Based Learning (hereinafter, referred to as PBL), in which learning is accomplished in the center of a very ‘complicated’ and ‘unstructured’ ‘task’ on the basis of a certain ‘circumstance’, is rising as a new alternative plan [2], [3]. The PBL based on the epistemology of constructivism is an

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educational approach constructed by a curriculum and teaching in the center of the problematic situation in actual life.

In order to perform an e-PBL research, the present paper chose the following research questions. First, e-PBL elements applicable in an effective computer education are extracted from an analysis of a prior PBL research adapted in other subjects. Second, an e-PBL learning model and problems, which can be used in the information communication technical education at the sixth grade level of an elementary school, are developed and applied.

2 e-PAS System for e-PBL

In the present paper, a web-based e-PAS system (e-PBL Assistance System) to support an efficient e-PBL class is proposed. The present system includes processes for the e-PBL cooperative learning and group learning, an instructor module for managing information, and a learner module. The students can register themselves, manage learning, collect information, perform mentoring, and conduct web discussions through the learner's interface and the instructor can manage the information through the instructor's interface.



Fig. 1. e-PAS module

This system supports the following roles. First, the system provides the learners with appropriate learning activities on-line. Second, the system is used as a means of collecting and saving learning materials for class development and submitting the study results. Third, the system provides the e-mentoring activity concerning the learning method, the problem solving strategies, and the structure of the problem which are made in the learning activity. Fourth, the system takes the role of sharing and developing the learning content by exchanging information between the students. The e-PAS system is the e-PBL supporting system and overcomes the limitations of time and space which are the weak points of the PBL and includes an on-line mentoring module. Fig. 1 represents the e-PAS system module.

3 Experimental results

Since the e-PBL has the characteristics of being conducted both on-line and off-line, the principles for developing the problem were made based on the characteristics of the environment of two and the processes of selecting a topic, presenting the learning objectives, the outline, writing scenarios, and the verification were performed. Therefore, in the present paper, the following principles were applied to develop the e-PBL problem. First, a problem was selected which can reflect the students' real-life or a variety of experiences. Second, the problem should have an unstructured characteristic which can be solved by using knowledge, information and ideas. Third, cooperation with the school education curriculum should be considered.

To verify the effectiveness of this paper, 120 students from three classes of sixth graders at an elementary school in Pyongtaek, Gyeong-gi province were chosen and homogeneity tests and ICT usage skill tests were performed. Therefore, as the learning topic adapted to the present paper, three subjects of a 'presentation', 'information world to be shared with', and 'various comprehensive activities' in the information and communication education curriculum of the elementary sixth grades were selected.

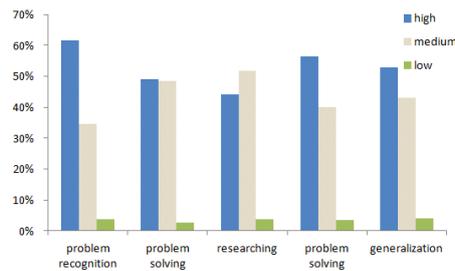


Fig. 2. analysis of creative learning ability in e-PBL

To see an improvement in the creative learning ability after adapting the e-PBL model, a survey was conducted for the entire class. Fig. 2 shows the percentage of students by three groups of a higher group, a medium group, and a lower group. As a result of the survey, the problem recognition ability was 61.5% in the higher group, 34.7% in the medium group, and 3.4% in the lower group and the problem solving plan ability was 40.9% in the higher group, 48.4% in the medium group, and 2.5% in the lower group. In addition, the researching ability was 44.3% in the higher group, 51.9% in the medium group, and 3.8% in the lower group and the problem solving and presenting ability was 56.4% in the higher group, 40.1% in the medium group, and 3.5% in the lower group. Finally, the generalization ability was 52.9% in the higher group, 48.4% in the medium group, and 4.1% in the lower group. According to an analysis of the elements of the creative learning, since many students responded in the higher group and the medium group, it can be said that the e-PBL class was effective in improving the creative learning ability.

3 Conclusion

An e-PBL model and problems for an effective computer education were developed and applied in the present research. As a result, the following conclusions were obtained. In order to progress an effective e-PBL class, a support learning system including an e-mentoring and a web discussion function has to be built. In addition, the e-PBL adapting problems should be an 'unstructured practical problem', 'learner-centered problem', 'process reflected problem', and 'cooperative learning reflected problem', which are directly involved in real life. Finally, the e-PBL problem and the model were effective to improve the students' information literacy ability. The results of the e-PBL model and the learning problems, which are proposed in the present research, can be changed depending on the support system, environment, and learning content. Therefore, the e-PBL model, the problems, and the support system, which reflect various learning environments, contents, ages, and levels of the students, should be continuously studied and developed. Also, class satisfaction, the ability to perform individual tasks, the group learning ability, mentoring usage, and usage satisfaction should be studied by applying a variety of analysis techniques.

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