Concerto II: A Learning Community Support System Based on Question-posing

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Abstract

The authors created a Web-based collaborative learning system, which supported question-posing by learners, assessment from peers, and communications with question-posers and peers. They applied it to an actual university course. As the results, they identified some features to be enhanced, i.e., communication support, solution to a problem with respect to quality of posed questions, and motivation improvement. This paper describes a learning community support system based on question-posing called Concerto II to solve the problems.

1. Introduction

With the rapid advance of information society, many Web-based learning support systems have been developed. Providing Web-based learning environments enables learners to learn at anytime at any places. We focus on learning based on question-posing. Some literature pointed out that question-posing is a highly intelligent activity, and that it contributes to improve students' problem solving [2]. Learning effectiveness is also expected by students (respondents) answering questions which were posed by other students (posers) and by collaborative learning such as questions and answers between posers and respondents or comments by respondents.

Some research projects have been launched with respect to a question posing-based learning support system in recent years [3, 4, 5]. While they have some common features, each study provides its unique feature. We developed a question posing-based collaborative learning support system called Concerto and applied it to an actual university course [1]. As the result, we identified necessity that facilitates positive communication among learners. We propose a collaborative learning community support system based on question-posing called Concerto II.

The rest of this paper is organized as follows: we start describing related work in the next section. Section 3 discusses some problems that were emerged from the results of an experiment. We also describe requirements for communication support. Section 4 briefly describes system design of Concerto II.

2. Related work

QSIA is a Web-based learning environment, which provides question-posing, knowledge sharing (recommendation of questions to a learner), and assessment as major facilities [3]. It mainly focuses on knowledge sharing and assessment.

Takagi et al. developed a learning system that supported the following learning process [4]: (1) learners pose questions based on the course contents, and group members review them, (2) the question poser registers the question that has finished review into the database, then the instructor reviews the registered questions, (3) the instructor prepares the online tests by extracting questions from the database and opens them, and (4) students pose questions that are similar to the opened ones. In question-posing, only the mode of multiple choices is supported. Takagi et al. emphasize on learning effectiveness through group review.

QPPA is a Web-based learning support environment which provides four major functions [5]: (1) question-posing, (2) assessment, (3) browsing of questions and (4) exercises in the form of drill. In question-posing, only the mode of multiple choices is supported. QPPA was applied to students of the upper grades in an elementary school. The evaluation was carried out from the viewpoint of usability of major functions and difficulty (easiness) of question-posing among subjects (the system was applied to mathematics, natural science, and social science) by questionnaire.

We developed a question posing-based learning support system [1]. It provided following major functions: question posing, answering questions, assessment, threaded BBS-based communication support, and data analysis.

Our approach is same as the studies by Takagi et al. and QPPA in that it focuses on question-posing by
students. As we think assessment for questions from a lot of learners and communications with a lot of learners contribute to enhance effectiveness of learning, we suppose that the abovementioned activities are carried out not by groups but by the whole class. We also support not only mode of multiple choices but also that of free descriptions as the question style. As for communications support, Takagi et al. describe group review for questions students posed. OPPA and QSIA do not support communications. We develop a system, which emphasizes on collaborative learning such as modifications of questions based on the assessment results from peers and communications with them, and version management of questions.

3. Enhancement requests for Concerto based on the results from its experiment

We applied Concerto to an actual university course called “Introduction to a computer system” whose objective is to give lectures on principles of digital computers. Concerto was applied during 22 May 2006 through 10 July 2006. Fifty questions were posed by twenty-four students. As forty-eight students registered their account, only half out of all the students posed questions. Students answered 1454 questions in total and wrote 926 assessment comments. We identified some problems and insights to the system from both the data stored in the system and those from questionnaire. We describe them and their solutions that are not implemented by other studies.

(1) Problem on communication support

Few discussions occurred. Only eleven threads and thirty-three messages were exchanged. “Request comment for the instructor” was not used.

We found current communication support is not positioned in the question-answering process but in the list of questions. For example, a learner who answered a question by free descriptions may not understand whether his/her answer is correct or not. In such a case, communication support will help him/her. In the current version, discussions are supported only to opened questions. The system should have supported discussions on the way of the process of question-posing.

(2) Problem on quality of questions

A learner gave a comment, “as question-posers are students, posed questions are not accurate and reliable”. We just supposed learners should make communications on the questions with the communication support function. As another solution, it may be necessary to present information on whom created questions and the quality score for his/her questions by peers (we call them profile information).

(3) Request for question posing

We met a situation in the experiment that a student requested peers in a BBS of some question for posing other questions that were similar to the question (s) he answered. We did not anticipate such a communication pattern in designing the system. If such a message stays in a particular thread of a particular BBS, it may be buried. Such a message will become a hint for question-posing. Therefore we will provide the function, which allows a user to request for question-posing and follows up the status.

4. Concerto II

We are now implementing Concerto II. Concerto II has not only functions of Concerto but also those that reflected the enhancement requests in section 3, i.e., enhanced communication support, association of questions with profile of question-posers, and request for question-posing. In addition, as a way of improvement of motivation, we consider to present profile information and achievement of each learner by user interface like Social Networking Service (SNS).

5. Conclusion

We have proposed a learning community support system based on question-posing by presenting the results of application of the initial version of our question posing-based learning support system and their solutions. Concerto II enhances communication support, takes motivation improvement into account, and provides a solution to a problem on reliability of questions. We will complete the implementation of Concerto II and apply it to the 2007 year’s course.

Reference