Peer Assessment Modes within an Online Student-Generated Questions Learning System

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ABSTRACT

In view of the theoretical and empirical support for the use of student-generated questions in education and the numerous useful features of network technology, several online student question-generation learning systems with peer-assessment components have been developed. Since most of the similar existing systems were limited in terms of the types of communication modes used in peer-assessment, three different peer-assessment communication modes were included. Users’ perceptions and preference toward various peer-assessment modes were examined. The data collected found that multi-way was the most preferred communication mode and was perceived as providing the most support for learning. In light of the theoretical and empirical support, the fact that no existing systems of this type utilize the multi-way mode, suggestions and implications for system design and development are offered.

Keywords: Learning Strategies, Online Learning System, Peer-Assessment, Student-Generated Questions, Student Perceptions

1. INTRODUCTION

In traditional classrooms, teachers are seen as the main knowledge-holders and transmitters whereas students are expected to take on the role of knowledge-receivers and recorders. To assess students’ cognitive ability and comprehension, spaced practice sessions with questions from teachers or textbooks dominate current teaching practices. In such situations, students are conditioned to respond to pre-constructed questions that teachers or subject matter experts think are meaningful, important and interesting [1].

In light of contemporary education theory, constructivism in particular, researchers and practitioners have been paying more and more attention to having students construct questions on studied materials that they think are relevant and important [2]. The goal of instruction, from the perspectives of constructivists, is to create situations that enhance learners’ interpretations and reflections for their own understanding and cognitive development [3]. In contrast to traditional classrooms where students answer questions given by teachers, enabling students to contribute to questions encourages and legitimates active and creative manipulation of information and knowledge on the learners’ part [4].

Studies on student-generated questions have provided an empirical basis for its usefulness in enhancing learners’ retention of information, reading comprehension, use of cognitive and metacognitive strategies, motivation, productive studying habits, in-group communication and interaction, satisfaction with past learning experiences, question-generation abilities, and problem-solving abilities, etc. [1-2, 4-10]. In light of the predominately positive effects for facilitating cognitive elaboration and achieving meaningful learning as well as the advantageous features of network technology, a couple of web-based student-generated questions learning systems, for instance QAIS [11], MCIDA [12], ExamNet [13], and QPPA [4], were designed and developed.

Since all of the available online student-generated questions exercises only allow students one mode of peer interaction during the process, the following sections present an overview of an online student-generated questions learning environment with a focus on peer-assessment. A preliminary study examining participants’ preferences and perspectives towards three various peer-assessment models is presented. Finally, results from the study and implications for system developments and future studies are discussed.
2. OVERVIEW OF THE ONLINE
STUDENT-GENERATED QUESTIONS
LEARNING ENVIRONMENT WITH VARIOUS
PEER-ASSESSMENT MODES

The system is mainly comprised of two sub-systems: question-generation and peer-assessment.

Question-Generation

The system supports various types of student-generated questions learning activities, i.e., true-false, matching, multiple-choice, fill-in-the-blank, and short-answer. Students need to type information in all required fields for a successful submission. For instance, for multiple-choice question-generation, students need to provide a question-stem, four alternatives, an answer key, and references for each posed question. With the support of computer technologies, students can incorporate multimedia files including graphics, animation, sound and video clips as part of the question. This multimedia capability is clearly an indispensable and advantageous feature when compared to paper-and-pencil based question-generation methods for domains and topics that stress visual and audio recognition and differentiation.

Peer-Assessment

So that question-authors could receive feedback about specific question items, the authors embedded a “peer-assessment” element to complement the student-generated questions activity. Essentially, assessors offer feedback using an online assessment form. Assessment criteria associated with different types of question are provided in the system to enable objective communication. In addition to using these pre-set comments as feedback for the question authors, detailed suggestions for further refinement of the item examined can be supplemented in an open feedback form by the assessors.

Although most available online student-generated questions learning systems include a peer-assessment element, a closer analysis revealed that only one communication mode, usually one way assessor-to-author (hereinafter named one-way mode), was available to users. To enhance interaction, collaboration and negotiation of meaning between question-authors and peer assessors, two peer-assessment modes, assessor-and-author two-way (two-way mode) and among assessors-and-author multi-way (multi-way mode), were built into the system in addition to the frequently used one-way mode. In essence, these two newly added modes allow question-authors to respond to assessors’ feedback. The main difference between two-way and multi-way modes lies in whether assessors assessing the same question item are able to view and respond to one another’s comments/feedback in addition to the author’s.

3. A STUDY ON STUDENTS’ PREFERENCES
AND PERCEPTIONS TOWARD VARIOUS
ONLINE PEER-ASSESSMENT MODES FOR
AUGMENTING STUDENT-GENERATED
QUESTIONS ACTIVITIES

Participants and Context

Participants included 49 student teachers enrolled in a teacher preparation program at a national university in Taiwan. The study took place in the “Instructional Principles” course for the duration of an 18-week semester.

The course curriculum included a total of nine chapters related to principles of effective instruction. The nine principles introduced were mainly based on Yelon’s “Powerful Principles of Instruction” [14]. They included the principles of meaningfulness, prerequisites, open communication, learning aids, novelty, modeling, active and appropriate practices, pleasant conditions and consequences and consistency.

Procedures

In the first class, after the instructor introduced the general requirements and course format, students attended an orientation session. Information about the basic concepts related to question-generation and peer-assessment along with examples of, and procedures for, interaction with the system were explained and practiced.

Following the instructor’s explanation of each principle, students were given twenty minutes to generate two multiple-choice questions in class. Then they were asked to assess four automatically randomly assigned questions and engage in a peer-assessment session after class. Students in the study tried each of the three peer-assessment modes on three occasions. Students’ performance on this exercise accounted for 50% of their final grade.

Measurements

During the last class a survey to gauge students’ preferences for, and perceptions of, the facilitating effects
of the three different peer-assessment modes was disseminated for individual student completion. The questions were worded as follows:

1. Which of the following is your preferred peer-assessment mode: one-way, two-way, or multi-way. Why is that?

2. In terms of learning, which of the following peer-assessment modes do you feel had the most facilitating effect when assessing questions: one-way, two-way, or multi-way. Why is that?

Data Analysis

Data on the quantitative responses was analyzed using an X² square test. Descriptive data was analyzed using the constant comparative method proposed by Lincoln and Guba [15].

4. RESULTS

Responses to question one showed that participants’ preferences among the three different peer-assessment modes were statistically significant at .05 ($X^2=42.29$) with more than three quarters of the respondents indicating that they preferred the multi-way (75.51%) while comparatively fewer respondents preferred the two-way mode (22.45%) and only one out of the 49 participants preferred one-way mode. While aspect of interaction between the question-author and assessor was well received by the learners, the respondents’ explanations revealed two main reasons further differentiating their preference for the two-way or multi-way modes: the depth versus variety of received comments, and the ability of all involved parties to see the whole picture. To elaborate, a preference for “focusing on” and “going deep into” one aspect of the assessed question without being “disturbed,” “confused” or “overwhelmed” by an influx of comments about other aspects of the question from other assessors was a feeling common among participants who preferred the two-way mode over the multi-way mode. On the other hand, the abilities “to receive more and varied perspectives” and “for all assessors involved to read and/or respond,” which stimulated further thought and discussion within the group, were emphasized by those who preferred the multi-way mode.

The data from question two showed that participants’ views toward the facilitating effects of the three different types of peer-assessment was statistically significant at .05 ($X^2=32.37$) with nearly 70% of the respondents (69.39%) choosing the multi-mode mode, 26.53% choosing the two-way mode, and the remaining 4.08% choosing the one-way mode as the most supportive mode for learning. The reasons for their selections reflected the sentiments revealed in their responses to question two.

5. DISCUSSION AND CONCLUSIONS

In view of the theoretical and empirical support for the use of student-generated questions in education and the numerous useful features of network technology, several online student question-generation learning systems with peer-assessment components have been developed. While most existing systems allow students to generate questions of different types using various media formats, and incorporate peer-assessment in conjunction with question-generation, all of them permit only one type of communication mode. Most employ the assessor-to-author one-way peer-assessment mode.

Considering that different interaction modes are possible, and flexible learning environments are easily actualized online, three various types of peer-assessment modes were built. The differences between the modes hinged on whether or not the question-author was allowed to communicate with the assessor about his/her rendered comments, and whether the assessors were allowed to communicate with each other. A study examining students’ perceptions of, and preferences towards, the three various peer-assessment modes was undertaken. The results regarding each and their implications are discussed separately in the following sections.

Students’ Perceptions and Preference toward Various Peer-Assessment Modes

The data showed students to be most supportive of the multi-way mode, followed by the two-way mode in terms of preference and perceived support for learning. While all three different types of peer-assessment modes built in the system allow assessors to gauge the adequacy and correctness of the constructed questions, and to offer written recommendations to question-authors, the two-way mode was perceived as a better mode for achieving mutual understanding between authors and assessors when compared to the one-way mode. Additionally, being able to focus on one aspect of the assessed question with one assessor at a time was perceived as an advantage of the two-way mode over the multi-way mode. The volume of assessments in the multi-way mode was potentially disruptive, especially when one assessor commented on technical aspects related to the question-stem, while another one made
comments on the answer or distractor (depending on the specific type of question), and another one made remarks on aspects related to the learnt content, and all the assessments were posted for all involved to see at the same time. The potential cognitive overload of participants using the multi-way mode is an important area not to be ignored when incorporating this methodology into classrooms.

On the other hand, the benefits associated with the multi-way mode, such as participants receiving “more and varied perspectives” must not be discounted. As social construction of knowledge theorists suggest, interaction and communication among peers facilitates higher quality comprehension by disequilibrating the learners’ existing conceptualizations [16-18]. Disequilibration will most likely occur when students interact and exchanges different thoughts and perspectives of various kinds. Given that a larger volume of varied perspectives are received in the multi-way mode as compared to other modes, its inclusion in online learning systems should be beneficial. This finding is particularly important considering that currently no other online student-generated questions systems have built in the multi-way mode.

Future Studies

The current study examined students’ preferences for, and perceived usefulness of, three different peer-assessment modes. Though preliminary data substantiated the two-way and multi-way over the one-way peer-assessment mode, some areas are certainly worth exploring further. Specifically, will different peer-assessment modes affect learning processes and/or outcomes differently? In terms of process, will multi-way and two-way lead to different quantities and types of comments? In terms of learning outcomes, will one-way, two-way and multi-way lead to differences in the quality of the questions generated and academic achievement in the applied context? Answers to the above questions have theoretical importance and practical implications for classroom implementation, as well as the design of online systems that employ peer assessment.

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7. REFERENCES


