# A Supporting System for Pupils' Question-Posing and Peer-Assessment

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**Abstract:** Although a number of online supporting systems are developed to investigate the effect of question-posing and peer-assessment, most of them target on college and graduate students, rather than pupils. Thus, it is still unclear whether the pedagogies of question-posing and peer-assessment could also be applied to pupils. To this end, a Rabi system is developed to investigate pupils' use of online question-posing and peer-assessment, including the quality of posed questions, and the effect of peer-assessment.

## Introduction

Recently, it has attracted more and more researchers' attention to facilitate students to play as an active role in learning activities. Making students pose questions is regarded as a significant element for an effective learning since the constructive process involves a number of cognitive strategies, such as organization, association, elaboration, clarification, and inferring. In addition to individual question-posing, peer-assessment is one of useful approach for collective knowledge, in which students are provided with opportunities to play the role of "assessor" to facilitate the social construction, as well as the cognitive conflict arisen from peers' different opinions (Topping, 1998). Due to these reasons, a number of supporting systems that harness collective knowledge are proposed, such as Question Sharing and Interactive Assessment (QSIA) system (Rafaeli, Barak, Dan-Gur, & Toch, 2004), and Question Posing and Peer Assessment system (Yu, Liu, & Chan, 2004; 2005).

When reviewing these systems, we could find that most studies target college and graduate students as subjects. Little research focuses on the investigation of pupils so that it is unclear whether question-posing could also be applied to pupils. Are pupils capable of posing their questions? What are the qualities of the posed questions? What are their assessing capability and qualities? To answer these questions, there is a need to develop a supporting system that is suitable for pupils so that these research questions could be answered.

## Rabi System

### Article-reading

In the article-reading phase, teachers prepare materials related to a specific topic so that pupils could login the Rabi system to read the articles. Pupils need to understand these learning materials and generate their questions from the materials. In addition, the article-reading and question-generation phases are inter-related. Pupils could go to the question-generation phase to pose questions, and then back to the article-reading phase to read the article more comprehensively.

### Question-posing

The multiple-choice question is the type emphasized in the Rabi system. A multiple-choice question consists of a question stem and four candidate items (i.e., one correct item and three distractive ones). Although the multiple-choice question type is commonly used, there have been few studies providing the scaffolding to guide the students in the question-generation process. With the exception of the 5W1H (where, who, what, why, when, and how) key words provided by the AGQ system (Chang et al., 2005), there has been little effort made to construct the guidance for a question-generation process. Therefore, in this study we propose a six-criterion guidance in the Rabi system. A summary of the six-criterion guidance is listed in Table 1.

Table 1: Main aspects and description of the six-criterion guidance.

| Aspects | Criteria | Description |
|---|---|---|
| Impact | Relevance | The posed question is relevant to the article |
| | Significance | The posed question covers key ideas or significant concepts |

| | | |
|---|---|---|
| Expression | Clearness | The statement is terse and easy to understand |
| | My wordings | The statement is written based on my understanding |
| Item design | Correctness | The posed question has one and only one correct answer |
| | Distraction | The posed question provides distractive incorrect answers |

## Question-answering

The questions generated by the pupils in the previous phase are collected by the Rabi system. The system then distributes these questions so that each pupil receives certain questions generated by peers (see Figure 1). In the question-answering phase, pupils are asked to answer these questions first and then assess them in the peer-assessment phase. The design rationale for the question-answering phase is to make students have better awareness when examining these questions from the perspective of "answerer."

## Peer-assessment

In the peer-assessment phase, pupils are asked to evaluate the assigned questions according to the same six-criterion used in the question-generation phase. The six-criterion guidance helps pupils to assess peer-generated questions. Since pupils apply the same criteria during the question-generation and peer-assessment phases, they are able to compare the opinions as both "generator" and "assessor." This might help them to judge peers' products from different perspectives. A 5-point scale is used for scoring each criterion, ranging from strongly disagree (1 point), disagree (2 points), neutral (3 points), agree (4 points), to strongly agree (5 points). In other words, pupils are asked to give their comments to the assigned questions according to the six-criterion guidance by assigning them a ranking of 1 to 5 points.


Figure 1. Snapshots of the Question-posing and Peer-assessment Phases.

## Work in Progress

After the Rabi system was developed, an experiment was planning to be conducted to address the research questions. The target participants were fifth-grade elementary school students. The learning material included articles and animations for children about financial management that are provided by Citi Bank. The question type was emphasized on multiple-choice because it is a common type that elementary students are familiar.

## References

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