

# An Initial Study of Learning Methods to Improve the Quality of Student-Generated Questions

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Student-generated questioning or question posing activity proved to have a positive impact on students' learning as students are enabled to develop higher-order thinking skills and seek richer knowledge. However, students are having trouble in creating high level questions which is why they might not be able to develop higher-order thinking skills. One way to solve this issue is to implement the activities from the creative processes, that recommends a way to generate a high-level idea by gathering inspiration, generating the idea, and also improving its quality through refining the idea. In this study, we implemented online learning with question posing and question refinement activities to improve students' generated questions quality. Utilizing off-the-shelf online tools from the Internet, we proposed a learning strategy for generating better questions by incorporating the activities in creative processes collaboratively and individually. The activities are *gathering* knowledge, *question generation*, and *question refinement*. These activities are performed respectively.

We examined our proposed learning strategy using a between-subject design with different numbers of students involved (individual, two students, and three students). The students are coming from different academic backgrounds, which are generally not familiar with our selected topic for the learning material.

Based on our initial pilot study we found out that most of the students are able to improve the quality of other students' questions and their own questions in the refinement stage based on questioning rubric by Taboada and Guthrie. Moreover, we also found that students refining questions collaboratively in the pair condition have no significant difference in terms of quality level compared to students refining individually. Whereas when students are refining questions collaboratively in the triad condition, they can improve the questions to a better quality.

In addition, from the questionnaire and interview results, the students claimed that the question generation and refinement activities helped them gain deeper understanding and helped them memorize the learning material.

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