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A self-regulated flipped classroom approach to improving students' learning performance in a mathematics course.

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Summary: The flipped classroom is a well-recognized learning mode that enables effective practice and interactions among teachers and students in the class by switching the in-class instructional time and out-of-class practicing time. However, owing to their lack of self-regulated competence, most students might fail to browse and comprehend the instructional materials out of class by themselves. In this paper, a self-regulated flipped classroom approach is proposed to help students schedule their out-of-class time to effectively read and comprehend the learning content before class, such that they are capable of interacting with their peers and teachers in class for in-depth discussions. In order to evaluate the effectiveness of the proposed approach, a quasi-experimental design was employed in an elementary school Mathematics course. The experimental group students learned with the self-regulated flipped classroom approach, while the control group students learned with the conventional flipped classroom approach. The study was conducted using a quantitative approach. The instruments used were a performance test, and questionnaires of self-efficacy and self-regulation. The experimental results indicated that the post-test score of the experimental group was significantly higher than that of the control group. It was also found that the higher self-regulation students showed significantly different learning achievements when learning with different approaches, while there was no significant difference between lower self-regulation students with the different learning approaches. Moreover, the experimental group showed significantly higher self-efficacy than the control group. In addition, the learning log analysis results further showed that, conforming to the objective of the self-regulated strategy, the students would determine the goals for the next learning phase based on their current performance. To sum up, the findings of this study indicate that integrating the self-regulated strategy into flipped learning can improve students' self-efficacy as well as their strategies of planning and using study time, and hence they can learn effectively and have better learning achievements.

Classification: D40 U50 U80
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