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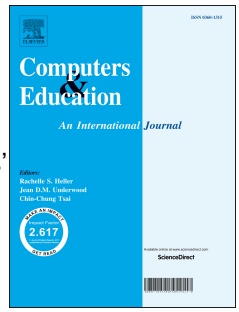

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Impacts of an augmented reality-based flipped learning guiding approach on students' scientific project performance and perceptions

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Abstract

In recent years, flipped learning has received increasing emphasis; it engages students in deriving basic knowledge through instructional videos before the class, and hence more time is available for practicing, applying knowledge, or student-teacher interaction in class. Many scholars have pointed out that, with such a learning approach, teachers can design more effective in-class activities by guiding students to have higher order thinking as well as interactions with peers and teachers. In the meantime, researchers have also indicated that employing proper educational technologies or learning strategies could further improve students' performance. Therefore, in this study, an Augmented Reality (AR)-based learning guiding mode is proposed for developing a flipped learning system. To examine the effectiveness of the proposed approach, an experiment was conducted in a natural science learning activity of an elementary school using the developed system. The participants were four classes of 111 fifth graders. Two classes were assigned to the experimental group, while the others were the control group. Those learning in the experimental group used the AR-based flipped learning mode, while those in the control group learned with the conventional flipped learning mode. From the experimental results, it was found that the AR-based flipped learning guiding approach not only benefited the students in terms of promoting their project performance, but also improved their learning motivation, critical thinking tendency, and group self-efficacy.

Keywords: applications in subject areas; interactive learning environments; pedagogical issues; teaching/learning strategies

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