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# Learning English with Augmented Reality: Do learning styles matter?

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## ABSTRACT

This study attempted to develop and compare two Augmented Reality (AR) educational game systems for third graders to learn English vocabulary in free and situated surroundings. One system was developed based on a self-directed learning approach which did not restrict the learning sequence, while the other was based on a task-based learning approach which limited the learning sequence. The flow experience, cognitive load, foreign language learning anxiety, and learning effectiveness of the students with different learning styles (i.e., serial or global) were assessed. The results showed that the students using the self-directed or task-based AR educational game system had similar and high learning effectiveness, although those using the self-directed system revealed higher flow experience. However, the students with a serial learning style had lower mental effort and foreign language learning anxiety regardless of using the self-directed or the task-based AR educational game system. It was found that the challenge and control of the system conformed to the students' proficiency. The learning objects (e.g., pen, pencil, book, chair, desk, eraser, ruler, etc.) did not have a restrictive learning sequence. Providing free learning steps was preferable, and restricting which step to begin with was not necessary. This

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