

Personalization of Gamification in Education: Where Augmented Intelligence Meets Playfulness

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Gamification, i.e., the use of game design elements in non-game contexts, has been successfully used to design better (virtual) learning environments aiming to increase positive experiences such as motivation, engagement, satisfaction, meaningful social interactions, self-efficacy, and flow. Recent advances highlight the importance of tailoring gamification design in education to maximize its benefits to students and reduce its potential negative effects. Nevertheless, the process of adapting and personalizing gamification for educational purposes requires knowledge about gamification design and how these elements influence students' flow state. This influence may differ according to the context (learning materials, pedagogical approaches, feedback, etc) and the individuals' characteristics (culture, age, user type, etc). Thus, in the past 10+ years, my research group has studied the factors that influence gamification design and use artificial intelligence techniques to augment human capabilities to better personalize gamification in educational contexts, particularly for STEM (Science, Technology, Engineering, and Mathematics) learning. To discuss the personalization of gamification in education, we will first discuss some of the positive and negative effects of gamification based on recent literature reviews. Then, a series of experiments carried out by my group will be presented to show how different contextual variables (e.g., culture, educational content, time on task, students' interests, etc.) affect the potential benefits of gamification in education, particularly in the context of Computer Science Education. Finally, using these findings, we will present a taxonomy and data-driven framework to assist teachers in making decisions to design personalized gamified experiences.

Keywords: Artificial Intelligence in Education, tailored gamification, educational technology.