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Editorial

Diverse Development and Future Challenges of Game-Based Learning and Gamified Teaching Research

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1. Introduction

Play is one of the most important activities in human life. To promote the motivation and effectiveness of learners, the use of games in various areas of teaching is becoming increasingly common. Among them, game-based learning emphasizes the design of educational games that can achieve learning objectives. On the other hand, gamification focuses on the use of game mechanics and elements (e.g., points, badges, interactive rules, etc.) to make learning activities fun. These two strategies of using games in teaching and learning not only have the potential to enhance motivation and performance, but also promote the key competencies of learners, such as problem solving, collaborative communication, and strategic thinking. Although there has been a great deal of research on the use of games in education, with the development of technology (e.g., metaverse) and changes in the global environment (e.g., the impact of pandemics), the use of educational games or gamified teaching activities in teaching practice needs to be continuously innovated and evaluated to dynamically bridge the gap between academic research and teaching practice at any time. In this regard, this Special Issue focuses on research on the use of educational games or gamification mechanisms in teaching practice, or reviews of previous research in this area.

2. Content of the Special Issue

This Special Issue contains a total of 13 articles, which can be broadly divided into 3 categories:

1. Recent research on game-based learning applied to various disciplines:

This category contains articles on game-based learning in various disciplines, including game design and empirical evaluation. The forms of games include digital games and board games, and the subject areas include language, vocational orientation, science, etc. Among them, it is worth noting that three of them are related to escape room game mechanics [1–3]. This type of game requires learners to use their knowledge and abilities to perform problem-solving tasks in a specific virtual space, which is a game mechanism with a great potential for developing problem-solving skills. The articles in this Special Issue contain design frameworks and quantitative and qualitative empirical analyses of escape room educational games for readers' reference in design and evaluation.

2. Studies on the use of gamification mechanisms in teaching and learning:

These studies cover the evaluation of the use of gamification mechanisms in actual classrooms and the analysis of possible bottlenecks in their implementation. In addition, they include the analysis of the effectiveness of specific gamification mechanisms, such as badging mechanisms [4], in the curriculum.

3. Systematic reviews of the literature on the use of games in teaching and learning:

These systematic reviews should be useful for understanding the research on the use of games in teaching and learning in the last decade, including the research issues on the

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use of games in education, and the development of games in teaching and learning in specific subject areas (e.g., [5]).

3. Future Challenges and Research Issues

From the direction of these articles, we can see that the development of game-based learning and gamification education has become increasingly diverse in recent years, and an increasing number of studies have started to review the past literature and explore the current status and bottlenecks of academic research and teaching practice in this field. Accordingly, the following is a list of potential challenges or key research topics for the future use of games in teaching and learning:

1. Remote or blended game-based teaching solutions:

Due to the impact of the pandemic, schools, training institutions, teachers, and students were forced to use online learning tools for learning, thus making the use of remote teaching technology more popular. Therefore, remote or blended educational games or gamified teaching activities may be a potential research area. The timely integration of the advantages of physical and distance courses can lead to more effective and high motivational teaching and learning activities that can break time and space constraints at a lower cost.

2. Highly authentic situated game-based teaching and learning activities with virtual-real integration:

The trend of metaverse and artificial intelligence technology may cause changes and impacts on the theories, tools, evaluation, and promotion strategies for the use of games in education. Among them, the use of artificial intelligence, augmented reality, virtual reality and mixed reality, and various virtual space interactive tools/editors to construct situated role-playing educational games will be a promising trend, and it is expected to combine real or virtual inquiry-based problem-solving activities to achieve learning transfer (e.g., escape room educational games). However, the integration and use of future technologies involves a high degree of complexity. Teachers often need researchers to propose relevant cloud-based tools, design frameworks, and sample cases that have been validated by empirical research as guides to lower the threshold of introduction in the educational field and truly achieve the purpose of promoting game-based learning to on-site teaching practice.

3. Scaffolding-oriented game-based learning mechanism and multidimensional evaluation:

In view of the increasing number of studies reviewing the previous literature and exploring the current status and bottlenecks of academic research and teaching practice in this field, the possible gaps between theory and practice promotion were also found. Possible reasons for these gaps might include that although many studies on game-based learning have found the effectiveness of games, an educational game is an organic body composed of different game elements and mechanisms. Exactly which game mechanisms promote learning effectiveness or motivation, or which mechanisms do not achieve the expected learning-supporting effects, will require more precision in future research in order to fine-tune specific game mechanisms. In this regard, it is a possible trend to combine game mechanisms with scaffolds to assist the learning process, and to analyze the effects of various mechanisms by embedding specific scaffolds (e.g., conceptual scaffolds, peer scaffolds, or metacognitive scaffolds) in the game mechanisms and analyzing the effects of the mechanisms through a multidimensional post-evaluation of the learners (including the effectiveness, psychological factors, behavioral records, and feedback on the usefulness of the scaffolds). This may become an important research direction in the future.

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