

EDITORIAL PREFACE

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Welcome to the *International Journal of Game-Based Learning* (IJGBL). This issue includes seven papers related to interesting topics including games to teach mathematics, languages or gaming skills, gamification techniques to improve engagement and learning, and the perception of Game-Based Learning amongst teachers, parents, and students.

Together these papers show the importance of user-centered approaches, and the need to consider the background of all stakeholders, in terms of knowledge, gaming propensity, gender, and preconceptions, if Game-Based Learning is to become more widespread in both formal and informal educational settings. Another strong theme in this issue is the one of games for social integration. As studies gather evidence on the cognitive and motivational benefits of game-based approaches, these articles remind us how much education and instructional tools ought to support behavioral change, for both personal growth and the benefits of society at large.

In the first paper, DeByl presents a study where gamification techniques were employed to increase students' engagement and enjoyment. DeByl explains how gamification has been used throughout the years, including in the corporate world, the differences between gamification, GBL and Serious Games (SGs), and how the boundary between these categories can often become blurred. According to DeByl, elements of gamification (e.g., leader boards or

badges) have always been present in education, although they were more commonly known as extrinsic reward systems and based on behavioral theories. DeByl argues that there is little empirical evidence, to date, on the motivational and educational benefits of gamification and related techniques. She explains that gamification can be easily implemented because it requires little or no changes to technologies already used in educational settings. She describes common gamification techniques, and explains that gamification may bring education closer to its initial goals, because it promotes intellectual growth and encourages individuals to focus on their own achievements rather than competing against their classmates. DeByl then describes a study conducted in Bond University, where gamification was employed for the delivery of game courses with 22 undergraduate students. DeByl found that the gamified curriculum seemed to increase attendance compared to non-gamified classes. Her study also revealed factors, and their respective impact, that contributed to students' engagement with a gamified curriculum, including playfulness, comparative pedagogy (i.e., the interest in and acceptance of other teaching methodologies), and performance (i.e., students' attitude towards their performance); the most influential factor was playfulness. DeByl explains that novelty and opportunities for a new experience play an important role in students' acceptance of and

adherence to a course. She believes that the gamification of the curriculum was successful because it matched these criteria, but she also suggests that, although gamification can be effective, it should only be applied after a thorough understanding of students' motivation.

In the second paper, De Grove, Van Loy, and Mechant compare the use of commercial and bespoke educational games for language learning. Amongst other interesting findings, their study shows that enjoyment and appreciation of games is not always related to their technological features. Instead, the authors found that the experience of playing a language video game could be influenced by non-game elements, such as prior use of video games, irrespective of the age of the player. The results lead the authors to question the alleged divide between digital natives and digital immigrants. According to them, the acceptance and impact of educational video games may require designers to profile the target population more accurately, as intrinsic motivation to use these may vary greatly between the so called digital native and digital immigrants, but also within the digital natives, as not all of them may be motivated to use this medium.

In the third article, Denham explores how basic mathematical skills can be enhanced through Game-Based Learning. He employs Woodward's instructional approach to design a 3D-based educational game. He reviews the current state of the art in GBL and mathematics teaching and explains that, contrary to common perceptions, multiplication is not solely confined to rote memory, because it involves other skills that ought to be accounted for, such as adaptive reasoning, and strategy, which are usually understood through the mastery of mathematical concepts. Denham explains that very few studies have tried to assess the use of non-digital games for teaching mathematics so far, and that the studies reporting on the use of digital games for mathematics often lack data on the learning outcomes. The experiments conducted by Denham help to explore how a video game could impact on students' enjoyment and overall understanding of mathemati-

cal concepts. Results show that the game had a significant effect on the time completion for multiplications, as well as students' enjoyment. Denham then suggests theoretical explanations for the success of his game and explains that, amongst other factors, the game environments may have matched the requirements for automaticity, one of the features usually perceived to enhance mathematical proficiency.

In the fourth paper, McDaniel and Kenny explore pre-service teachers' perception and acceptance of console games to be used in the classroom, and they study how cognitive styles may affect adherence to this educational paradigm. They explain the differences between field-dependent and field-independent subjects (i.e., the ability to discern an item from its context), and that such profiles may explain to which extend individuals may require external support for decision making, be distracted by irrelevant features, organize their perception in less structured environment, and learn and progress in a game. According to the authors, the link between cognitive styles and learning patterns in games could be related to the fact that games usually involve a bottom-up approach and the identification of patterns in terms of game play and game objects, as players usually need to adapt their knowledge and imagine creative solutions to a challenge or problem. The study, which included 50 participants from an American southern university, revealed that pre-service teachers with a field-dependent cognitive style often found games difficult to learn; this perception seemed to determine, to some extent, their gaming frequency. The study also shows that the exposure to a gaming setting with simple game rules and mechanics may shift their opinion on the benefits and use of games for teaching; this is probably because by playing a video game, such teachers can become more proficient in the game controls and associated mechanics, and increases their confidence in using such games. According to McDaniel and Kenny, such preconceptions may be linked to players' learning styles and their future profession, which often expects teacher to deliver a step-by-step and linear content, rather

than supporting open-ended environments. The authors suggest that the inclusion of games in teacher training may help to lower this hurdle and make it possible for teachers to become more confident in using this technology and consequently harness games in their classrooms.

In the fifth paper, Tan explores the creation of a First-Person Shooter (FPS) game to train professional FPS gamers. He explains the difficulty to gather and use the knowledge from professional gamers, and how this was addressed. Tan also describes the process involved in designing and creating the trainer, as well as the many challenges encountered by his team along the way. Throughout this article, Tan emphasizes the necessary collaboration between the gaming industry and academics, and the creation of multidisciplinary teams accordingly. Tan also defines how simple tools, such as use cases and flowcharts, may support this collaboration and alleviate possible communication issues.

In the sixth paper authored by Uzun, Yildiz, and Kartal, it is revealed how teachers and students perceive games to teach foreign languages. They argue that very few games for second language learning are not engaging and seldom use web 2.0 features, such as discussions forums or chat rooms. Such tools, probably due to their anonymous nature, seem to lower communication barriers, increase participants' confidence and motivate them to communicate. Uzun, Yildiz, and Kartal emphasize the digital divide between teachers and learners, and describe a study that included Turkish participants from a wide range of educational settings (e.g., primary school or university) and perspectives (e.g., teachers or parents). The study included analyses of both qualitative and quantitative data related to respondents' attitude to games and educational games. The study revealed significant difference across ages and genders in terms of GBL perception and game propensity. Although all age groups and genders agreed on the potential benefits of digital games, differences appeared across age groups as to the use

of GBL. For example, it revealed a possible digital divide for male either younger or older than 30, the latter preferring a more traditional approach to learning, although such a divide was not observed amongst females.

In the seventh and last article, Ruggiero, de Hurtado, and Watson explore how game creation activities can be used to engage and educate juvenile offenders. They describe a two-week study carried out during the *Project Tech Camp*, a project that aims to harness social activities inherent to collaborative games creation to promote learning and skills. In this environment, participants were required to create a video game, and consequently learn by doing, investigating, and collaborating with their peers. The authors followed the progress of 10 juvenile offenders throughout these two weeks. Using exhaustive data (e.g., journals, interviews, or questionnaires), Ruggiero, de Hurtado and Watson identified three themes, namely game development as motivation, discovery learning to promote game development, and meaning-making through the creation of a game on social issues. The authors found that participants preferred playing games rather than creating them, and they also found that this preference may be affected by the degree of immersion and discovery learning experienced in the game development activities (i.e., participants were more interested in winning than understanding the social issues). Interestingly, it emerged that the behaviors of the participants and their perception of the experience may be influenced by the opinion of the natural leader of the group. Discovery learning occurred in many forms, both motivating and hindering the learning process at times. For example, participants learnt from each other but became frustrated when they could not understand why their game would not work as expected. In many cases, participants' assessment of their skills differed greatly, but those with more realistic expectations usually learnt the most, probably because they realized how much was required and consequently identified suitable learning

material and strategies. This interesting study shows how collaboration and the establishment of relationship with both peers and mentors can influence learning. In terms of meaning-making, most participants were able to use their experience to create the game, envisage how the game could be created to teach a social issue, and make a connection between the game creation activity and their convictions. By creating and developing their game, an emotional connection

and sense of ownership emerged, thus motivating them to engage further in their activities. I hope that you find these articles both inspiring and informative.

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Patrick Felicia is a Lecturer, Researcher and Course Leader at Waterford Institute of Technology (WIT). He works within the Department of Computing, Mathematics and Physics. Dr. Felicia earned his PhD in computer science from University College Cork. In WIT, his research and teaching is focused on the use of innovative and engaging educational experiences by combining Gaming Technology, Instructional Design and Educational Psychology. His research interests include Game-Based Learning, Technology-Enhanced Education and Adaptive Educational Systems. Dr. Felicia has presented and published internationally and has conducted several studies on the use and benefits of Game-Based Learning.