Games and Gamification in Business School Courses: Experiential Education that Creates Engagement and Flow

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This special issue focuses on games and gamification in business school courses. Games are a kind of experiential learning that promotes more active engagement-- – a learning by doing, instead of learning by listening – that helps students understand the integration among concepts and apply their lessons to plausible real-world problems. Contemporary theories of effective learning promote active, experiential, problem-based learning, and games are consistent with these approaches (Connolly et al., 2012). Empirical studies support that games can help students gain content knowledge, perceptual and cognitive skills, behavior change, and social skills (Connolly et al., 2012). The subjective experience of playing games (i.e., affective and motivational outcomes) is also an important dimension in the effectiveness of games.

How do we define a game? This question became relevant for the special issue editors as we received a range of submissions to our call for papers. We received some examples of experiential exercises

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that were novel and fun, but did not meet our definition of a game. We returned to the literature to get more clarity on the features of games. The essential attributes of educational games are a player or players, conflict/cooperation (such as obstacles which prevent players from reaching goals), rules, predetermined goals, an artificial or fictitious nature, and educational characteristics (Sauvé et al., 2007). The mechanisms of games include immediate feedback, interaction, challenge, player control of their learning, and sometimes teamwork (Sauvé et al., 2007).

"Serious games" are defined as games "that have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement" (Abt, 1970, p. 9). Since they are typically video games, serious games benefit from the greater realism and immersion that is possible with technology (Tsekleves et al., 2016). In the educational domain, a serious-games mindset means that teachers pay special attention to learning objectives and outcomes. Learning by games involves the acquisition of new knowledge, behavior, and attitudes, and importantly, the transfer of learning to real world contexts. It is also associated with the development of intellectual skills, such as problem-solving, strategy-building, abstraction, and anticipation (Sauvé et al., 2007). A successful educational game should have clear learning objectives, complementary aesthetics and game mechanics, and well-designed instructional aids to guide faculty in implementation (Chen, this issue).

Individual game elements or sets of game elements can be applied to assignments and class structures without having a full game experience. This is called *gamification*. Dicheva et al. (2015) outline gamification design principles such as goals, challenges, customization, feedback, freedom of choice, and freedom to fail. Kapp (2012) also includes game elements such as rules, competition, time constraints, rewards, levels, and storytelling. Gamification can be a more modest step to achieve some of the motivational benefits of games while still maintaining a traditional framework of lectures and assignments.

Games are thought to provide greater intrinsic motivation and learning engagement for students. How and why do games work? The underlying learning mechanisms are related to increased intrinsic motivation and flow (Czikszentmihalyi, 1990), which can come from the clear and challenging goals, along with the regular and unambiguous feedback of well-designed games. While flow has been studied in the context of games, the precursors of flow in this context are not fully understood. In this special issue, Zhao, Srite, Kim, and Lee investigate the role of team cohesion on perceptions of flow in the paper titled "Effect of Team Cohesion on Flow: An Empirical Study of Team-Based Gamification for Enterprise Resource Planning Systems in Online Classes". The authors use ERPsim, a commercial product available from SAP which enhances students' understanding of how to use ERP software. The simulation integrates business processes through collaboration with team members and competition against other teams. The authors examine if team members' perceived team cohesion influences their perceptions of flow, measuring three flow dimensions of concentration, perceived control, and perceived enjoyment. The outcome measures are perceived learning outcomes and intention to learn about ERP systems. They find that flow, one type of intrinsic motivation that influences perceived learning outcomes, can be formed from team cohesion. This finding suggests the importance of attaining team cohesion in a virtual, team-based gamified environment. They note that

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this is especially relevant as organizations increase virtual work due to globalization and also in response to the COVID 19 pandemic. One contribution of this study is that it focuses on the social aspects of gamification, instead of the more common technocentric focus.

One of the learning benefits of serious games is high levels of transference, so that knowledge, facts, concepts, and skills can be transferred and applied outside of the game context to the real world (Tsekleves et al., 2016). There is a clear link between serious games and problem-based learning (PBL), and PBL is well-suited for serious games in technical and scientific subjects such as decision sciences. The PBL approach is investigated in this issue in the paper titled "Assessing a novel problem-based learning approach with game elements in a business analytics class" by Bayley, Wheatley, and Hurst. The authors experimentally evaluated a gamified self-directed activity to help students develop several business analytic concepts and skills (e.g., Bayes' Theorem, queueing, simulation, network models). Comparisons between students who used the gamified approach and a conventional "chalk talk" approach were made. They found that there were no differences in actual student learning between the two approaches; however, somewhat surprisingly, students perceived the conventional lectures as being more engaging, with a more effective format, and giving them better preparation for answering (future) difficult questions. The authors note a possible reason for this finding is that their study combined PBL and gamification, two pedagogical approaches that can have opposite effects on student perceptions. Specifically, students perceive PBL as difficult (requiring more cognitive load), and thus less effective – even if the extra effort they invest eventually leads to better learning. Gamification is often an effective motivator for students, but apparently in this experiment the motivating effects were not enough to offset the perceived difficulty of self-directed PBL.

When we think about adopting games, faculty attitudes and comfort with games are also important. Some faculty may perceive games as mere 'edutainment' – more focused on fun than educational objectives. In these cases, students may focus primarily on winning the game, not learning. While winning can motivate the students to play the game, it may not contribute to learning objectives. Thus it is important to have planning and alignment between learning objectives and how games will be integrated into a course (Tsekleves et al., 2016). Further, games should be considered within a wider portfolio of learning methods and resources, such as laboratory activities, books, articles, and videos.

Barriers to adopting games are addressed by Chen in the special issue paper titled "A searchable spreadsheet for educational games in the decision sciences". The premise of this paper is that some faculty whom Chen calls "never users" are apprehensive about trying games. The fears of never-users might include concerns about the amount of time required to prepare and run games, uncertainty about the technical complexity of game play, and fear of losing control if an exercise goes badly. The author elaborates that "it is common to bungle gameplay a few times before getting a hang of a particular game" (which may or may not allay new adopters' fears!), but that faculty are generally able to work out any difficulties after a few runs. With a small amount of experience faculty can also customize games to fit their own students and learning context. They review of list of potential

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concerns that faculty might have, with helpful suggestions for averting or managing them. Sometimes it can be hard to find relevant exercises, so the authors have developed a searchable spreadsheet of decision science games available in Supplemental Materials for the article.

This special issue also includes two original games. The first is "The Hunger Chain: A competitive simulation for teaching supply chain management" by Song, Park, and Zhao, which is an online game designed to teach students about managers' irrational supply chain behaviors – namely the cycles of panic orders and hoarding that can happen when supplies are insufficient to meet demand. The Hunger Chain simulates the behaviors of multiple decision makers and their competition for limited supply in a decentralized setting. Supply chain risk management is an especially timely topic, given the recency of the COVID 19 pandemic which led to panic buying and hoarding of basic household items. In addition to giving students the frustrating experience of supply chain shortages, the game also illustrates some solutions such as the fair sharing allocation rule. The authors ran an experiment to compare the learning outcomes and attitudes of students who completed the game and those who learned in a traditional lecture mode. A statistically significant improvement in mean test performance was shown for students who completed the game, and student attitudes were also positive towards the game.

The other game in this special issue is a simulation. Simulations are considered a special category of games offering a dynamic model of reality defined as a system. They are simplified models with fidelity, accuracy, and validity (Sauvé et al., 2007). An effective simulation places learners in real decision-making situations, and gives real-time feedback. "Simulations provide students the opportunity to observe the outcomes of their actions, and take responsibility for decision-making via problem-solving competencies, thus leading to a more active, transformative and experiential reception of knowledge." (Vlachopoulos & Makri, 2017, p. 25).

Sauve et al. (2007) note that simulations differ from games because players are not typically looking to "win" or beat the game. The simulation in this special issue is titled "A simulation for managing retail inventory flow using RFID and bar code technology," by Atkins, Sener, and Russo. The authors have put forth a simulation of a retail and warehousing environment using automatic identification and data capture (AIDC) technologies. The simulation sets up a group competition using a real bar code scanner and radio frequency identification reader, with simulated small warehouse boxes. Students compete for speed and accuracy, and in the process learn how to manage the flow of inventory in a retail environment. While the exercise requires a significant amount of setup by instructors, the efforts appear to pay off—their outcome data assessing student attitudes about the simulation were positive.

Readers who have successfully used games in their courses as well as those who are new to this pedagogical approach will find resources and inspiration in these papers. It is our hope that this special issue will stimulate additional research on games and gamification in business school courses. As faculty consider additional uses of games in the delivery of their courses and design empirical

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studies to examine the effectiveness of these games, we urge careful and proactive attention to the design of measures of learning outcomes. Taken as a whole, the papers in this special issue suggest that student perceptions of learning and objective learning outcomes can be difficult to measure and can highlight unexpected outcomes in empirical studies. Reviewers of the papers received for the special issue often pushed authors to develop better measures of learning outcomes and to provide more convincing evidence about the effects of games on student learning. This was especially true of objective measures of learning outcomes which are essential to the development of a deeper and richer understanding of the conditions under which games and gamification improve learning outcomes for our students.

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