Encouraging intrinsic motivation in management training: The use of business simulation games

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Abstract

Business simulation games are one of the most effective tools for motivating and engaging players actively in the learning experience. In this context, understanding which factors promote the intrinsic motivation of players is of primary importance. Self-determination theory (a theory of human motivation) postulates that contexts that support satisfaction of the three innate psychological needs for competence, autonomy, and relatedness allow individuals to maintain intrinsic motivation. However, no previous research has applied this theory to explain motivation while playing business simulation games. To address this gap, we propose that satisfaction of the needs for competence, autonomy, and relatedness influences players' intrinsic motivation, which in turn facilitates engagement. This study also explores the impact of intrinsic motivation and engagement on the development of generic skills and perceived learning. Based on a survey of 360 undergraduate business students who used a business simulation game, the findings provide support for most of the hypothesized relationships.

Keywords: self-determination theory; basic psychological needs; intrinsic motivation; engagement; business simulation games; management

1. Introduction

The use of games and gamification has received increasing attention in the literature in the last few years (Buckley & Doyle, 2016; Kasurinen & Knutas, 2018). The growing interest in games stems from the idea that they influence behaviour by affecting motivation. Gaming environments have great appeal, and players are highly motivated to engage in them (Ryan, Rigby & Przybylski, 2006).

In the context of management training, business simulation games are one of the most effective tools for motivating and engaging players actively in the learning experience (Vos & Brennan, 2010). In addition, the fast development of information technology has allowed business games to innovate, evolve, and spread (Baldissin, Bettiol, Magrin

& Nonino, 2013). When playing business simulation games, players are more excited and motivated and become actively involved in the decision-making process (Ben-Zvi, 2010). In fact, previous research has provided evidence of the positive benefits of using simulation games (Sitzmann, 2011; Vogel et al., 2006). However, the results of the meta-analysis by Wouters, van Nimwegen, van Oostendorp and van der Spek (2013) showed that serious games, such as business simulation games, were no more motivating than conventional instruction. Therefore, understanding which factors support motivation in management training with business simulation games is of primary importance.

The self-determination theory (SDT) (Deci, 1975) is a widely researched theory of human motivation that has analysed individuals' motivation in the major spheres of life, such as education, work, and play (Deci, Olafsen & Ryan, 2017; Thaggard, 2010). SDT holds that individuals' behaviours can vary in the degree that they are autonomously motivated or controlled, resulting in different degrees of self-determination or motivation (Deci & Ryan, 2000). In particular, SDT firstly differentiates between intrinsic motivation, which refers to performing an activity for its inner interest, and extrinsic motivation, which refers to performing an activity for attaining some separable outcome (Deci et al., 1996). Extrinsically motivated behaviours can also vary in their degree of self-determination, from less self-determined to more self-determined, resulting in external regulation, introjected regulation, identified regulation, and integrated regulation (Deci & Ryan, 2000). Finally, SDT also posits amotivation as the lack of motivation to carry out the activity (Deci & Ryan, 2000).

Among the different types of motivation, intrinsic motivation, which is "prototypically autonomous" (Gagné & Deci, 2005; p. 334), is desirable. When intrinsically motivated, people perform activities for the positive feelings resulting from the activities themselves. They display curiosity, explore novel stimuli, and work to master optimal challenges (Deci, 1975; Deci & Ryan, 2008). Likewise, they have more interest, which in turn manifests as enhanced performance (Deci & Ryan, 1991). Intrinsic motivation has also been related to improved psychological well-being or learning outcomes (Ryan & Deci, 2000). In particular, in the education context, the most positive educational outcomes are those that came from purely autonomous motivation (Guay, Ratelle, Chanal, 2008).

Due to the importance of experiencing intrinsic motivation, analysing which factors promote intrinsic motivation among individuals is crucial. In this regard, several studies have analysed contextual and personal factors that facilitate or undermine it (Guay et al., 2008). In particular, cognitive evaluation theory (CET) (Deci & Ryan, 1985), a subtheory within SDT, posits that contexts that support satisfaction of the three innate psychological needs for competence (i.e., experience mastery and effectiveness), autonomy (i.e., the ownership of one's behaviour), and relatedness (i.e., feeling of being connected to others) promote intrinsic motivation, whereas contexts that diminish these needs undermine intrinsic motivation (Ryan & Deci, 2000).

In sum, SDT seems particularly suitable for investigating motivation in business simulation games, as the theory has been applied to analyse motivation in education (Guay et al., 2008; Niemiec & Ryan, 2009) as well as in different gaming contexts, such as gamified courses (Hanus & Fox, 2015), videogames (Ryan et al., 2006; Peng, Lin, Pfeiffer & Winn, 2012; Przybylski, Rigby & Ryan, 2010; Sepehr & Head, 2017), and massively multiplayer online games (MMOGs) (Eseryel et al., 2014). However, to the best of our knowledge, no one has empirically applied this theory in the context of business simulation games. In order to address this gap, we hypothesize that business simulation games are primarily intrinsically motivating to the extent that players satisfy their needs for competence, autonomy, and relatedness while playing, as proposed by the SDT (Deci et al., 1996; Niemiec & Ryan, 2009). We also look at the outcomes derived from the use of business simulation games. Specifically, we hypothesize that intrinsic motivation while playing business simulation games will facilitate engagement. In addition, we explore the impact of intrinsic motivation and engagement on the development of generic skills and perceived learning.

This article contributes to the literature in a number of ways. First, building on SDT, we provide a conceptual framework through which to understand which factors may promote players' intrinsic motivation in business simulation games. In particular, we analyse the effect of satisfying players' needs for competence, autonomy, and relatedness on their intrinsic motivation to play the business simulation game. Second, this study extends previous knowledge by examining the consequences of intrinsic motivation in terms of engagement, development of generic skills, and perceived learning. In particular, while previous studies have noticed that the use of business

simulation games seems to have a positive impact on students in terms of "increasing engagement in their studies" (Loon, Evans & Kerridge, 2015, p. 232), engagement has not been analysed according to its multidimensional nature, which includes cognition, emotion, and behaviour (Fredricks, Blumenfeld & Paris, 2004). The measures used have been very simple and have not reflected the true magnitude of the construct. Thus, this study fills this gap by assessing the three dimensions. Finally, the results can help academia and industry to understand how business simulation games used in management training must be designed to improve motivation, engagement, and learning.

This paper is organized as follows. First, we open with a brief discussion on the use of business simulation games. Second, we introduce our research model and its set of hypotheses. The fourth and fifth sections explain the research methodology and the empirical analysis and results, respectively. Finally, we present the discussion of the findings and conclusions.

2. Business simulation games

Business simulation games are virtual representations of real business situations. By simulating market trends, business simulation games allow players to manage a company within a risk-free environment. As Galea (2001) noted, failure in real world settings would have direct negative consequences for the organization. On the contrary, in a simulated setting the risks of failure are low and, therefore, students are encouraged to test out extreme decisions in a safe environment. Under such circumstances, learning from failure becomes more effective (Galea, 2001). In addition, as business simulation games provide an overall view of corporate strategic functions, they can be used as training tools. Specifically, business simulation games require players to make decisions and anticipate competitors' strategies while developing and implementing their own strategies (Doyle & Brown, 2000).

Business simulation games present an effective alternative to traditional teaching methods (Ben-Zvi, 2010) and are a suitable pedagogical tool for participants of different skills and backgrounds (Caulfield, Maj, Xia & Veal, 2012). By providing a context in which players are "learning by doing" (Caulfield et al., 2012), they enhance players' learning experiences (Matute & Melero, 2018). Players are of the opinion that playing

these simulation games is a useful, interesting, and rewarding learning experience (Lainema & Nurmi, 2006). Likewise, players consider that the nature of the learning includes many experiential components, such as constructing a holistic view of the functioning of a manufacturing company (Lainema & Nurmi, 2006). Playing business simulation games also improves performance (Pasin & Giroux, 2011) and has a positive impact on players in terms of heightening their interest in the field of management (Loon et al., 2015).

Additionally, business simulation games allow players to develop a range of skills and competencies (e.g., teamwork, working under pressure, and leadership) that are highly valued in the business world, as well as in modern education systems (Doyle & Brown, 2000; Borrajo et al., 2010). When playing, individuals experience great cognitive gains, especially in terms of critical thinking and problem-solving (Loon et al., 2015). Students also report lower levels of indecisiveness after participating in business simulation games (Wellington, Hutchinson & Faria, 2017). Moreover, business simulation games help students understanding how business decisions are made in the real world (Vos & Brennan, 2010). Finally, business simulation games have also been associated with enhancing career readiness (Hanson, Hooley & Cox, 2017) as well as with developing entrepreneurial behaviours among students (Kriz & Auchter, 2016).

Despite wide consensus over what advantages business simulation games can provide, their use and introduction in companies and business schools are fraught with difficulties. Doyle and Brown (2000) report that simulations can create anxiety and frustration in players, which can have a negative effect on their learning. This may be due to the highly competitive nature of the game or the inherent pressure of decision-making in a limited time (Matute & Melero, 2018). This frustration can be compounded by team conflict and freeloading of some participants (Adobor & Daneshfar, 2006). Other concerns include that business simulation games' software may be costly for most institutions and that instructors must be well prepared to answer questions and deal with participants' frustration (Pasin & Giroux, 2011). Additionally, if players do not perceive the simulation to be realistic, they may not take it seriously or may lose motivation (Adobor & Daneshfar, 2006).

3. Theoretical framework and research hypotheses

As noted earlier, SDT (Deci, 1975) is an approach to human motivation that advances the classical division of motivation to identify distinct types of motivation depending on the perceived forces that move a person to act (Ryan & Deci, 2000). Intrinsically motivated activities are defined as "those that individuals find interesting and would do in the absence of operationally separable consequences" (Ryan & Deci, 2000; p.233). On the other hand, according to SDT, extrinsically motivated behaviours can vary in the degree to which they are self-determined or autonomous versus controlled, ranging from external regulation to introjection, identification, and integration (Deci & Ryan, 2000). SDT also posits amotivation as the lack of both intrinsic and extrinsic motivation (Deci & Ryan, 2000).

Due to the fact that intrinsic motivation is desirable (Deci & Ryan, 1991), significant attention has been given to the study of the conditions that enhance versus undermine this type of motivation (Deci & Ryan, 2000). According to CET (Ryan & Deci, 2000; Deci & Ryan, 1985), factors that enhance a person's satisfaction of his or her basic psychological needs support intrinsic motivation, whereas factors that diminish need satisfaction undermine intrinsic motivation.

SDT defines needs as "innate psychological nutriments that are essential for ongoing psychological growth, integrity, and well-being" (Deci & Ryan, 2000; p.229). Humans have three fundamental needs: competence, autonomy, and relatedness, and the satisfaction of these needs is essential for an individual's intrinsic motivation (Ryan & Deci, 2000). Competence refers to the experience of behaviour as effective and masterful (White, 1959). It is related to the need for challenge and the ability to produce desired outcomes. CET argues that socio-contextual factors that conduce feelings of competence during action (e.g., optimal challenges and effectance-promoting feedback) can enhance intrinsic motivation for that action (Ryan & Deci, 2000). Besides competence, CET specifies that intrinsic motivation needs individuals to experience a sense of autonomy. Autonomy refers to the experience of one's behaviour as choiceful (de Charms, 1968). This relates to the desire to self-organize experiences and act in accordance with one's own sense of self. Finally, CET underlines the importance of building positive interpersonal relationships for intrinsic motivation (Ryan & Deci, 2000). In this sense, relatedness refers to the experience of connection with others (Baumeister & Leary, 1995). In academic contexts, relatedness refers to students'

feeling of belonging in the classroom, as well as the quality of the relationships between students and teachers (Reeve, 2006). In gaming contexts, relatedness refers to the quality of the relationships among players (Ryan et al., 2006). If these three needs are satisfied, growth and development result and intrinsic motivation for the task increases. When the three needs are not met, negative emotions may result and intrinsic motivation is undermined (Wang, Khoo, Liu & Diyaharan, 2008).

Previous studies in academic contexts have empirically examined the relationship between satisfaction of the basic needs for autonomy, competence, and relatedness and intrinsic motivation, finding that when the basic needs are satisfied, learners will show higher intrinsic motivation (Chen & Jang, 2010; Vallerand, Fortier & Guay, 1997). SDT has also been used to explain the motivations of players. For instance, Ryan et al. (2006) found that games are motivating to the extent that players experience autonomy, competence, and relatedness while playing. Previous studies have also confirmed that experiences of competence, autonomy, and relatedness are major contributors to game enjoyment and intrinsic motivation for videogame players (Przybylski et al., 2010; Tamborini et al., 2010). According to this, we hypothesize that business simulation games will facilitate intrinsic motivation if they satisfy players' psychological needs.

H1a: Satisfaction of the need for competence has a positive impact on intrinsic motivation.

H1b: Satisfaction of the need for autonomy has a positive impact on intrinsic motivation.

H1c: Satisfaction of the need for relatedness has a positive impact on intrinsic motivation.

According to SDT, contexts that facilitate satisfaction of the three basic psychological needs (and therefore foster intrinsic motivation) yield the most-positive psychological, developmental, and behavioural outcomes (Ryan & Deci, 2000). In this study, we focus on the impact of intrinsic motivation on three outcomes: players' engagement; players' development of generic skills, which has been shown to be one of the most important learning outcomes within the context of business simulation games (Borrajo et al., 2010; Fitó-Bertran, Hernández-Lara & Serradell-López, 2014); and players' perceived

learning in the field of management, which represents a retrospective evaluation of the learning experience (Caspi & Blau, 2008).

The concept of engagement has received considerable attention across a number of academic disciplines (Hollebeek, Glynn & Brodie, 2014). In particular, there has been increasing interest in this construct in relation to academic contexts (Skinner & Pitzer, 2012) and, more specifically, technology-mediated learning contexts (Henrie, Halverson & Graham, 2015). In this sense, engagement refers to "the quality of effort students make to perform well and achieve desired outcomes" (Sun & Rueda, 2012; p.193).

When analysing this construct, it is important to distinguish between the indicators of engagement and the facilitators of engagement (Sinclair, Christenson, Lehr & Anderson, 2003). On the one hand, indicators of engagement refer to "the features that belong inside the construct of engagement proper" (Skinner, Furrer, Marchand & Kindermann, 2008; p.766). Fredricks et al. (2004) describe engagement as a multifaceted construct comprising cognitive, emotional, and behavioural dimensions. According to these authors, cognitive engagement refers to learners' efforts in understanding what is being taught; emotional engagement refers to the feelings that learners have about the learning experience, such as interest, enjoyment, boredom, or frustration; finally, behavioural engagement includes behaviours necessary to academic success, such as participation and attendance. On the other hand, facilitators of engagement refer to "the causal factors (outside the construct) that are hypothesized to influence engagement" (Skinner et al., 2008; p.766), such as motivation.

Previous studies have found that motivational and learning factors such as interest, self-efficacy, and self-regulation positively influence student engagement (Bates & Khasawneh, 2007; Kanuka, 2005). Sun and Rueda (2012) also found that there was a positive correlational relationship between interest and all types of engagement (cognitive, emotional, and behavioural engagement). Finally, in a gaming context, enjoyment resulting from the satisfaction of the three psychological needs has also been found to increase gaming engagement (Boyle, Connolly, Hainey & Boyle, 2012). Thus, we propose the following hypothesis:

H2: Intrinsic motivation has a positive impact on engagement.

Previous studies in the context of education have shown that supporting intrinsic needs facilitates deeper and more-internalized learning (Deci et al., 1996; Rigby & Przybylski, 2009). Research has also shown that students who are intrinsically motivated express more creativity (Moneta & Siu, 2002), are more likely to persist on tasks (Vallerand & Bissonnette, 1992), retain more knowledge (Lepper & Cordova, 1992), and exhibit higher academic performance and achievement (Hanus & Fox, 2015; Deci & Ryan, 1985). In a gaming context, the intrinsic motivation of players has also been shown to positively affect persistence in gameplay (Neys, Jansz & Tan, 2014), whereas in an online gamified learning intervention, Buckley and Doyle (2016) found that those students who were intrinsically motivated reported an improvement of their general knowledge about the tax system.

In addition, engagement has been found to be a robust predictor of students' learning, grades, and retention (Fredricks et al., 2004; Reeve, 2013). Specifically, previous research has analysed the impact of cognitive, emotional, and behavioural engagement on important educational outcomes, such as academic achievement (Fredricks et al., 2004; Hughes, Luo, Kwok & Loyd, 2008), satisfaction (Filak & Sheldon, 2008), and students' persistence in learning (Fredricks et al., 2004).

We therefore propose that intrinsic motivation and engagement while playing business simulation games will positively predict both skill development and perceived learning.

H3a: Intrinsic motivation has a positive impact on skill development.

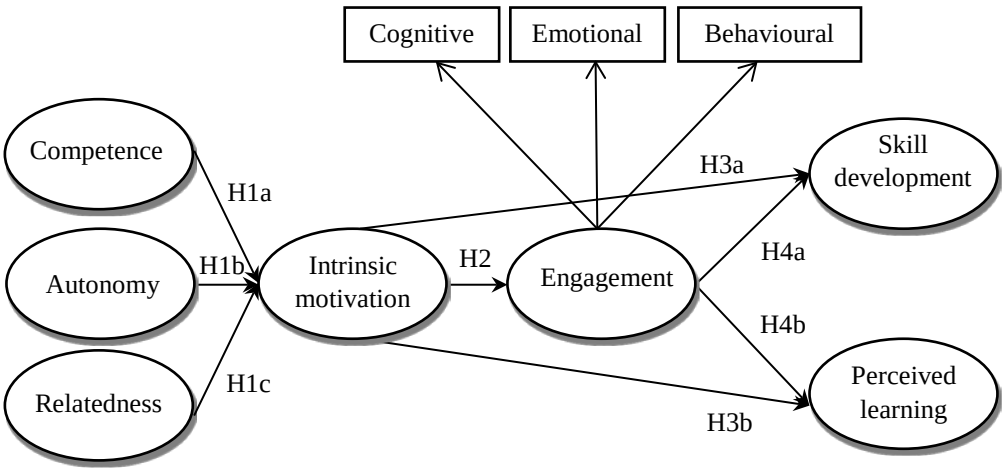
H3b: Intrinsic motivation has a positive impact on perceived learning.

H4a: Engagement has a positive impact on skill development.

H4b: Engagement has a positive impact on perceived learning.

Figure 1 presents the proposed model underlying this research.

Figure 1. Proposed model



4. Methodology

4.1. Data collection and participants

Participants were final-year business students who played a business simulation game at a major Spanish university in a semester-long course. Data was collected during two academic years: 2015-16 and 2016-17, at the end of each semester after the last gaming session. Players were asked to answer a self-administered Likert-style questionnaire. Participation in the study was voluntary, and the anonymity and confidentiality of data were guaranteed for the 360 individuals who participated.

4.2. Procedure

A business simulation game developed by Gestionet S.L. was employed in this study (https://simuladores-empresariales.com/simuladores/SimGestion.html). During the first sessions, the instructors explained the game and the software to the players. Once the game had been explained, players were divided into teams of 4–6 members. Each team managed a company to compete against other companies run by other players, forming a competitive environment. The business simulation game included ten rounds of decision-making by teams. In each round, players had to immerse themselves in an artificially created technology industry to manufacture and sell different air-conditioning products in three simulated markets similar to the markets in the European Union, North America, and South America. Besides making strategic decisions about which products to commercialize in which markets, players had to manage one

productive plant, so they had to deal with inventory, quality controls, outsourcing, and purchasing new machinery, among others. Finally, players had to make decisions on marketing areas (such as pricing, distribution, and investments in media planning) and on managing finances.

4.3. Measures

To measure the different variables included in the study, well-established scales were employed. Several criteria were used to select the measures for this research, including a strong theoretical basis and empirical evidence, as well as their use in previous research on gaming contexts and, therefore, relevance for our study. The measures were carefully adapted to ensure that the items fit the context. In particular, following several studies on gaming settings (e.g., Neys et al., 2014; Johnson, Gardner & Perry, 2018; Oliver et al., 2015; Tamborini et al., 2010; etc.), need satisfaction was measured using the Player Experience of Need Satisfaction scale (PENS; Ryan et al. 2006). This includes statements such as "I feel competent at the business game" (competence), "The business game provides me with interesting options and choices" (autonomy), and "I find the relationship with my group mates gratifying" (relatedness). To measure intrinsic motivation, the well-known Situational Motivation Scale (SIMS; Guay, Vallerand & Blanchard, 2000) was employed. This scale has been used to measure individuals' motivation in gaming settings in several previous studies (e.g., Birk, Friehs & Mandryk, 2017; Gao, Podlog & Huang, 2013; Guay et al., 2000), and includes statements such as "I think that the business game is interesting". Regarding engagement measures, in line with previous research in education (e.g., Nett et al., 2012; Wagaba et al., 2016), cognitive engagement was assessed through the Metacognitive Strategies Questionnaire (Wolters, 2004), with items like "When I am playing the business game I try to connect it with what I am learning through my degree". Additionally, emotional and behavioural dimensions of engagement were measured following Reeve (2013), using statements such as "When I am playing the business game I feel involved" (emotional engagement) and "When I am playing the business game I participate in group discussions" (behavioural engagement). The perceived learning measure was adapted from Tiwari, Nafees and Krishnan (2014). Finally, the selected skills hypothesized to be enhanced by the use of business simulation games – namely, decision-making, working under pressure, teamwork, and applying theory in

practice – have been highlighted in previous work as the most relevant skills acquired when playing these games (Loon et al., 2015; Borrajo et al., 2010; Fitó-Bertran et al., 2014). In all cases, seven-point Likert scale items were used, ranging from 1 (strongly disagree) to 7 (strongly agree). Table 1 provides an overview of all the measures used.

Table 1. Constructs, items, and measurement model results

Constructs and items	Mean	SD	λ	CR	AVE
Competence				0.94	0.86
COM1. I feel competent at the business game	5.52	1.14	0.92		
COM2. I feel very capable when playing the business game	5.58	1.08	0.93		
COM3. I feel effective in the business game	5.44	1.13	0.92		
Autonomy				0.90	0.76
AUT1. I experienced a lot of freedom in the business game	5.46	1.12	0.84		
AUT2. The business game provides me with interesting options and choices	5.48	1.06	0.90		
AUT3. I could always find something interesting in the business game to do	5.62	1.06	0.87		
Relatedness				0.92	0.80
REL1. I find the relationship with my group mates gratifying	6.34	0.86	0.90		
REL2. I find the relationship with my group mates important	6.25	0.86	0.90		
REL3. I feel close to my group mates	6.25	1.01	0.86		
Intrinsic motivation				0.91	0.77
INT1. I think that the business game is interesting	5.77	0.90	0.87		
INT2. I think that the business game is pleasant	5.33	1.13	0.90		
INT3. I think that the business game is fun	5.52	1.13	0.86		
Engagement				0.92	0.54
Cognitive engagement					
When I am playing the business game…					
COG1. I try to connect it with what I am learning through my degree	5.36	1.04	0.64		
COG2. I try to make all the decisions fit together and make sense	5.99	0.89	0.76		
COG3. I try to relate what I am learning to what I already know	5.66	0.93	0.73		
Emotional engagement					
When I am playing the business game…					
EMO1. I feel good	5.44	1.09	0.64		
EMO2. I feel interested	6.10	0.84	0.81		
EMO3. I have fun	5.59	1.09	0.69		
EMO4. I feel involved	6.16	0.81	0.77		
Behavioural engagement					
When I am playing the business game…					
BEH1. I try hard to do well in the game	6.16	0.88	0.82		
BEH2. I participate in group discussions	6.25	0.85	0.75		
BEH3. I listen very carefully to the teacher	6.00	0.97	0.69		
Skill development				0.90	0.66
SD1. Decision-making	5.58	1.00	0.84		
SD2. Working under pressure	5.51	1.13	0.81		
SD3. Teamwork	5.51	1.06	0.82		
SD4. Applying theory in practice	5.84	1.09	0.80		
SD5. Adapting to new situations	5.62	1.10	0.77		
Perceived learning				0.92	0.76
PL1. The business game helped me to understand the integration of business functions	5.51	0.99	0.87		
PL2. The business game helped me to understand how to analyse competitive advantages for a business	5.53	1.01	0.87		
PL3. The business game gave me a thorough understanding of target markets	5.36	1.18	0.86		
PL4. The business game gave me a thorough understanding of product positioning	5.41	1.11	0.88		

Note: SD: standard deviation; λ: standardized factor loading; CR: composite reliability; AVE: average variance extracted.

5. Analyses and results

To test the hypotheses, we employed partial least squares (PLS) structural equation modelling with SmartPLS 3.0 software (Ringle, Wende & Becker, 2015). PLS has less-restrictive assumptions about the distribution of data and, compared to other methods, such as covariance-based structural equation methods, it is more appropriate when the interest of the study focuses on prediction and on theory development, rather than on strong theory confirmation (Reinartz, Haenlein & Henseler, 2009).

Following previous research, engagement was modelled as a second-order reflective construct comprising cognitive, emotional, and behavioural dimensions (Fredricks et al., 2004; Hollebeek et al., 2014).

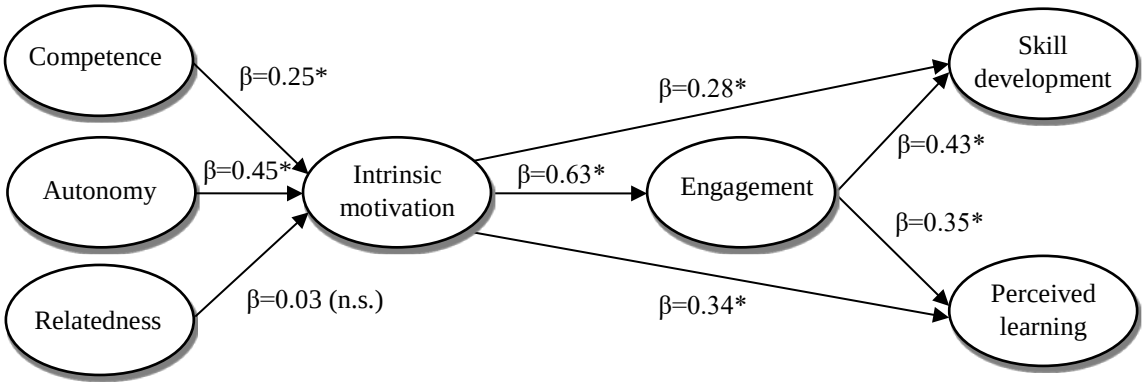
First, the reliability and validity of the constructs were assessed (see Table 1). All standardized factor loadings were above 0.6 (Carmines & Zeller, 1979), which suggests that individual item reliability was adequate. Moreover, all the constructs were internally consistent because their composite reliability (CR) values were greater than 0.7 (Nunnally & Bernstein, 1994). The constructs also met the convergent validity criteria because the average variance extracted (AVE) values were above 0.5 (Fornell & Larcker, 1981). Finally, discriminant validity was also supported. In all cases, the root of the AVE was greater than the correlation estimate for any two constructs (Fornell & Larcker, 1981).

The structural model was then tested. We used the bootstrapping algorithm with 5,000 subsamples to estimate the significance level of weights, loadings, and path coefficients. Satisfaction of the needs for competence, autonomy and relatedness accounted for 41.5% of the variance of players' intrinsic motivation. Likewise, the model explained 40.4%, 42.9%, and 40.2% of the variance in engagement, skill development, and perceived learning, respectively. The Stone–Geisser test criterion (Q2) exceeded the threshold of 0 for all dependent variables, thereby supporting the predictive relevance of the model.

The results indicate that satisfaction of the needs for competence ($\beta = 0.25$; $t = 4.72$) and autonomy ($\beta = 0.45$; $t = 8.32$) while playing business simulation games had a positive and significant influence on players' intrinsic motivation to play, supporting

H1a and H1b, respectively. However, contrary to predictions, satisfaction of the need for relatedness did not have a significant effect on players' intrinsic motivation to play the business simulation game (β = 0.03; t = 0.76). Therefore, H1c was not supported. As proposed in H2, intrinsic motivation had a positive impact on players' engagement (β = 0.63; t = 17.62). The results also show that players' intrinsic motivation during the simulation game had a positive and significant influence on their skill development (β = 0.28; t = 5.13) and perceived learning (β = 0.34; t = 5.61), supporting H3a and H3b. Finally, players' engagement positively influenced both their skill development (β = 0.43; t = 7.79) and their perceived learning (β = 0.35; t = 5.97). Therefore, H4a and H4b were also supported. Figure 2 presents the results of the structural model.

Figure 2: Structural results



Note: *p<0.01; n.s.: not significant

6. Discussion and implications

During the last few years, there has been increasing interest in the use of games and gamification to motivate individuals to perform tasks in different contexts (Buckley & Doyle, 2016; Kasurinen & Knutas, 2018). In particular, in management training settings, modern business simulation games are used as an effective tool to motivate, involve, and engage players in the learning experience (Vos & Brennan, 2010; Ben-Zvi, 2010). These games have an impact on both intrinsic and extrinsic motivation. While the way to increase extrinsic motivation is relatively easy (e.g., using leaderboards, badges, or incentives such as grades), increasing intrinsic motivation in business

simulation games seems to be a more difficult task to accomplish. As intrinsically motivated behaviours are more desirable than extrinsically motivated behaviours (Deci & Ryan, 1991), analysing which factors can promote intrinsic motivation while playing business simulation games is of primary importance for management training.

According to SDT (Deci, 1975), intrinsic motivation is determined by satisfying three basic needs: competence, autonomy, and relatedness (Ryan & Deci, 2000). Satisfaction of these needs fosters intrinsic motivation, which leads to higher-quality engagement and learning (Ryan & Deci, 2000). Based on this assumption, this research examines the relationships among need satisfaction, intrinsic motivation, engagement, and learning (namely, the development of generic skills and perceived learning) in the context of business simulation games.

Overall, the findings of this study provide strong support for the use of business simulation games in management training as a tool to promote intrinsic motivation among players, foster engagement, develop skills, and increase learning in the field of management. Our findings confirm that if players feel that their needs for competence and autonomy are satisfied within the business simulation game, they will be more intrinsically motivated to play the game. This is in line with previous studies in other gaming contexts, which also confirmed that experiences of competence and autonomy are major contributors to game enjoyment and motivation (Przybylski et al., 2010; Tamborini et al., 2010). However, we could not find support for the effect of the satisfaction of the need for relatedness on players' intrinsic motivation. An explanation for this could be found on the mean values as well as the standard deviations of each construct (see Table 1). As can be seen, among the three psychological needs, the satisfaction of the need for relatedness has the highest mean values as well as the lowest standard deviations. This indicates that, overall, students playing business simulation games in groups feel highly close with their group mates and perceived their relationship as gratifying and important for them. Therefore, as the satisfaction of the need for relatedness seems to be similar among all the individuals, the variance on players' intrinsic motivation to play the business simulation game depends on other aspects such as how competent and autonomous they feel while playing the game. Finally, our findings confirm that intrinsic motivation facilitates engagement during gameplay and that both intrinsic motivation and engagement enhance players'

development of generic skills, such as decision-making, working under pressure, and teamwork. They also enhance perceived learning related to the field of management, such as understanding the integration of different business functions, analysing competitive advantages, and understanding the positioning of products.

The current study offers a number of theoretical contributions. First, although a large number of studies (Ryan et al., 2006; Przybylski et al., 2010; Eseryel et al., 2014) have analysed the impact of need satisfaction on intrinsic motivation in a gaming context, to the best of our knowledge, this is the first study to analyse this relationship in the context of business simulation games. Drawing on SDT, this study sheds new light on how to promote intrinsic motivation within business simulation games, as well as on the relationships of motivation and engagement with players' development of generic skills and perceived learning. Specifically, while previous studies have emphasized the multifaceted nature of engagement in academic contexts (Fredricks et al., 2004), few have included all the dimensions related to the engagement construct in the context of business simulation games. Therefore, this study extends previous research by exploring cognitive, emotional, and behavioural dimensions of engagement in this specific context.

This research also has a number of practical contributions regarding how to design activities with business simulation games that promote intrinsic motivation and engage players in the learning experience. First, in order for players to experience intrinsic motivation, it is important to satisfy their needs for competence and autonomy. As explained before, competence is the ability to produce desired outcomes and to experience mastery and effectiveness. Optimal challenges were found to facilitate intrinsic motivation by increasing the feeling of competence during an action (Ryan & Deci, 2000). In addition, feedback mechanisms within the game are important for developing a sense of competence because they inform players about how well they are performing in the game (Csikszentmihalyi, 1990). Other factors that affect players' perceived competence include the difficulty of the tasks and the usability of the game (Eseryel et al., 2014). Besides competence, SDTs suggest that people must also experience their behaviour as self-determined; that is, they must experience a sense of autonomy, which refers to the ownership of one's behaviour (Ryan & Deci, 2000). Intrinsically motivated activities are activities that people do spontaneously when they

feel free to follow their inner interests (Deci, 1975). Thus, autonomy is essential for intrinsic motivation and has been associated with greater interest, more creativity, and better learning (Deci & Ryan, 1987). Game-based environments should provide learners with opportunities for autonomous choices. In particular, business simulation game design should try to avoid any constraints that may limit choices. Perceived autonomy would thus be enhanced in business simulation game contexts that provide considerable flexibility over strategies undertaken and the sequence of actions and that structure rewards so as to provide feedback, rather than to control players' behaviour.

There have been limitations to this study, which suggest directions for further research. First, in this study, we have focused on one form of motivation (namely, intrinsic motivation). However, other forms of motivation exist. Thus, future research could focus on other types of motivation (i.e., external regulation, introjection, identification, and integration) to fully understand the motivational power of business simulation games and its consequences for management training. Second, the use of retrospective and self-report measures in this study may be another limitation. Third, although surveys that use quantitative items (e.g., Likert scales) are commonly used for measuring engagement in academic settings, qualitative measures are another approach to measuring student engagement (Henrie et al., 2015). Thus, future research could use observations of individuals' behaviours; interviews and focus groups; and even physiological sensors (e.g., eye-tracking) as part of the methodology. Likewise, as the questionnaire was answered anonymously, we could not link students' responses to objective measures of student performance, such as student grades. Therefore, future research could include objective measures of students' performance (e.g., student grades) to further explore whether students' intrinsic motivation and engagement while playing business simulation games influence their learning. Another limitation of this paper could be that all scales were positively phrased. Therefore, the study could suffer from positive response bias. Future research should control for this. Moreover, it would be interesting to focus on the business game characteristics that influence the satisfaction of the needs for competence, relatedness, and autonomy, such as the challenges that individuals face and the feedback provided by the simulation, among others. Additionally, another limitation of this research is that the business simulation game competition was designed to be played by teams. Thus, future research should also analyse the use of business simulation games when players play individually.

Finally, another promising avenue for further research would be to analyse the proposed model for management training in non-academic contexts, such as a company's training program for its employees.

Despite these limitations, the findings derived from this empirical study contribute to understanding how to promote intrinsic motivation in business simulation gameplay and how this fosters engagement and enhances the development of skills and perceived learning in management training. We hope that the conceptual framework drawn from SDT and the results of the research offer new insights into the reasons why the use of business simulation games may facilitate learning outcomes.

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