Engagement in business simulation games: A self-system model of motivational development approach

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Abstract

This research draws on the self-system model of motivational development to explain how the use of business simulation games in class facilitates students' engagement and enhances their learning. Based on a survey of 360 undergraduate students who played a business simulation game in a marketing course, the findings show that students' perceptions of competence, autonomy, relatedness and self-efficacy have a positive impact on their cognitive, emotional, and behavioural engagement. In addition, cognitive and emotional engagement have a positive influence on skills development and perceived learning.

Keywords: competence; autonomy; relatedness; self-efficacy; engagement; business simulation games

1. Introduction

Engagement in the academic context has received great attention among scholars and educators for its potential to increase learning (Skinner, 2016), academic achievement (Zumbrunn et al., 2014), persistence in learning (Fredricks et al., 2004), performance (Green et al., 2012) and satisfaction (Filak and Sheldon, 2008). However, recent studies have noticed a decline in students' motivation, engagement and enjoyment over time (Furrer et al., 2014). Indeed, student disengagement is considered as one of the main problems in the OECD (Organization for Economic Co-operation and Development) learning systems (Hamari et al., 2016).

While students are little motivated by traditional classes, they are more often so in game-based settings (McGonigal, 2011). Therefore, in order to solve the problems associated with lack of motivation and engagement, recent studies have suggested gamifying learning aspects (Hamari et al., 2016), making academic activities more fun, interesting and appealing to students.

An effective teaching tool that motivates and engages players actively in the learning experience is business simulation games (Vos and Brennan, 2010). Business simulation games are virtual representations of real business situations that allow players to manage a company in a risk-free environment. By providing a context in which players are "learning by doing" (Caulfield et al., 2012), business simulation games offer an effective alternative to traditional teaching methods (Ben-Zvi, 2010) in disciplines such as marketing and management. Previous research has shown that positive benefits can derive from the use of business simulation games (Sitzmann, 2011), such as enhanced player interest in the management field (Loon et al., 2015) and improved learning experiences (Matute and Melero, 2016). Business simulation games have been also related to the development of numerous skills, such as decision-making, team working, working under pressure and adapting to new situations (Fitó-Bertrán et al., 2014; Loon et al., 2015; Pasin and Giroux, 2011). Similarly, they have been associated with increased learning in relation to understanding how business decisions are made in the real world (Vos and Brennan, 2010) and with an understanding of the practical integration of business functions (Borrajo et al., 2010; Fitó-Bertrán et al., 2014).

Although previous studies have recognised the benefits deriving from business simulation games, little is known about what factors make business simulation games successful (Matute and Melero, 2016). Drawing on the self-system model of motivational development (Connell and Wellborn; 1991; Skinner et al., 2008), this study investigates how the use of business simulation games promotes students' engagement. In particular, we postulate that students' perceptions of competence, autonomy, relatedness and self-efficacy while playing business simulation games promote their cognitive, emotional, and behavioural engagement. In addition, we look at the outcomes derived from the students' engagement. In particular, we hypothesise that the cognitive, emotional and behavioural engagement experienced while playing business simulation games will facilitate the development of various work-related skills and perceived learning.

This study contributes to the extant literature in different ways. First, we advance knowledge in the field by analysing business simulation games through the self-system model of motivational development. This model offers an interesting framework for the study of engagement. However, although previous research provides empirical support for the model (e.g., Dupont et al., 2014; Fall and Roberts, 2012; Skinner et al., 2008;

Zumbrunn et al., 2014), the evidence is limited in the context of business simulation games. Therefore, drawing on the self-system model of motivational development, this study sheds new light on the processes that promote students' engagement while playing business simulations games, by analysing the impact of individual factors on engagement and the effects of engagement on students' outcomes. Second, compared to the study of motivation, research into engagement is a relatively young area (Skinner, 2016). In addition, most engagement studies have not considered the multidimensional nature of the construct, which includes cognitive, emotional and behavioural components (Wang and Peck, 2013) and relatively few have focused on higher education (Zumbruun et al., 2014). To address these gaps, this research examines the multiple dimensions of engagement among undergraduate students. Finally, the results can help both academia and educators understand how business simulation games should be used to improve students' engagement and learning outcomes.

2. Business simulation games

Business simulation games are training tools based on simulated environments representing real business situations. Whereas failure in a real business setting would have direct negative consequences for an organisation, these virtual worlds allow players to manage a company within a safe environment (Galea, 2001), fostering learning.

The functioning of business simulation games provides an overall view of corporate strategic functions. While simulations in other fields are primarily aimed at developing specific skills, business simulation games provide training in various functions (e.g. production, R&D, marketing, accounting and finance), which helps the players to understand their interrelationships.

Due to their nature, business simulation games represent an effective alternative to traditional teaching methods (Ben-Zvi, 2010). Business simulation games help players to understand how business decisions are made in the real world (Vos and Brennan, 2010) and to develop a holistic view of the functioning of a manufacturing company (Lainema and Nurmi, 2006). Similarly, they have been associated with enhanced performance (Pasin and Giroux, 2011) and heightened interest in the management field (Loon et al., 2015).

Business simulation games are also an effective tool to help players develop the generic and specific managerial competencies that are highly valued in the business world (Borrajo et al., 2010; Doyle and Brown, 2000). For instance, they are useful for developing generic competences, such as information processing and analysis, decision making, communication skills and working with uncertainty (Fitó-Bertrán et al., 2014; Loon et al., 2015; Pasin and Giroux, 2011). Playing business simulation games also improves problem solving, team working and adaptation to new situations (Borrajo et al., 2010). Regarding specific managerial skills, playing business simulation games can increase one's understanding of the fundamentals of business administration and the relationship between business units and organisational functions, help in strategy development and, in general, help to meet company goals (Borrajo et al., 2010; Fitó-Bertrán et al., 2014).

3. Theoretical framework and research hypotheses

3.1. Student engagement

The concept of student engagement has attracted increasing attention over recent years (Lei et al., 2019; Xie et al., 2019) due to its potential predictiveness of students' learning outcomes, such as course grades, participation in class, academic achievement, course completion, reduced dropout rates, or satisfaction (Connell and Wellborn, 1991; Fall and Roberts, 2012; Filak and Sheldon, 2008; Fredricks et al., 2004; Reeve, 2013).

Overall, the student engagement literature is characterised by a lack of consensus. First, as noted by Christenson et al. (2012), there is no agreed standard definition of engagement. Secondly, although it seems that researchers agree that engagement is a multidimensional construct (Fredricks et al., 2004), there has been some variation in the number and type of dimensions included within the construct (Fredricks and McColskey, 2012). Some scholars have suggested that engagement includes behaviour and emotion (Skinner et al., 2009b), whereas others have proposed a three-dimensional model including behaviour, emotion and cognition (Fredricks et al., 2004; Fredricks and McColskey, 2012; Henrie et al., 2015; Lei et al., 2019; Skinner, 2016; Xie et al., 2019). Additional dimensions such as agentic engagement (Reeve and Tseng, 2011) have also been considered. Finally, another area of debate in the field of engagement is related to whether information about engagement should be provided by students, teachers, or

through classroom observation (Skinner, 2016), as well as if it should be measured with self-reported survey data or not (Xie et al., 2019) (see Fredricks and McColskey (2012) and Henrie et al. (2015) for a review on operationalisations and measures of student engagement).

In an attempt to address some of these definitional issues, Sinclair et al. (2003) recommended distinguishing between the facilitators of engagement and the indicators of engagement. *Facilitators of engagement* are the external causal factors that facilitate or undermine engagement (Skinner et al., 2008). They can be divided into different classes (Skinner, 2016). The first class focuses on individual factors or features of the *self* that promote engagement. These factors are also known as self-perceptions, self-appraisals and self-systems, and include variables such as feelings of belonging, self-efficacy and values. The second class of engagement facilitators focuses on social contexts and relationships that promote engagement, and includes variables such as support from parents, teachers and peers, school climate and the nature of academic work (Connell and Wellborn, 1991; Skinner, 2016). *Indicators of engagement* are internal features of the construct of engagement (Skinner et al., 2008). As mentioned earlier, it is widely accepted that the main indicators of engagement are cognitive, emotional and behavioural engagement (Fredricks et al., 2004). *Cognitive engagement* is the student's level of investment in learning, such as understanding what is being taught. *Emotional engagement* refers to the feelings that learners have about the learning experience, such as interest, enjoyment, boredom and frustration. Finally, *behavioural engagement* includes participation, attendance, effort expenditure and persistence (Fredricks et al., 2004).

3.2. The self-system model of motivational development

The self-system model of motivational development (Connell and Wellborn, 1991; Skinner et al., 2008), a framework grounded in the self-determination theory (Deci, 1975), provides a theoretical basis for understanding the processes by which social contextual factors impact on students' self-system processes and subsequent engagement and achievement. The model suggests that fundamental human needs – competence, autonomy and relatedness –, which are also central to the self-determination theory, are the basis for the development of self-system processes (Connell and Wellborn, 1991). Briefly, *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. *Autonomy* refers to the experience of one's behaviour as choiceful (de Charms, 1968). This relates to the desire to self-organise experiences and act in accordance with one's own sense of self. Finally, *relatedness* refers to the experience of connection with others (Baumeister and Leary, 1995). Accordingly, self-system processes such as sense of competence, sense of autonomy and sense of relatedness result in engagement or disaffection (Connell and Wellborn, 1991). In particular, the model posits that when psychological needs are met, engagement occurs, which is manifested in cognition, affect and behaviour. On the contrary, if psychological needs are not met, disaffection results (Connell and Wellborn, 1991). Additional self-system processes, such as *self-efficacy*, which refers to belief in one's ability to achieve a desired outcome (Bandura, 1997), are also of real importance (Eseryel et al., 2014; Zumbrunn et al., 2014).

3.3. Research hypotheses

Prior research into engagement in academic contexts provides support for the impact of students' self-system processes on engagement. First, perceived competence and autonomy have been associated with different dimensions of engagement, such as cognitive (Skinner et al., 2008), emotional and behavioural engagement (Dupont et al., 2014; Skinner et al., 2008). Connell and Wellborn (1991) also found that children with reported higher levels of autonomy were judged by their teachers to be more engaged in class. Relatedness was also found to be a predictor of emotional and behavioural engagement in elementary/primary school (Skinner et al., 2008) and high/secondary school (Shen et al., 2012). Finally, various studies (e.g. Eseryel et al., 2014; Zumbrunn et al., 2014) have also showed that students with higher self-efficacy tend to have reported higher engagement in class. Accordingly, we hypothesise that students' perceptions of competence, autonomy, relatedness, and self-efficacy while playing business simulation games will have a positive impact on cognitive, emotional, and behavioural engagement.

H1: Satisfaction of the need for competence has a positive impact on (a) cognitive engagement, (b) emotional engagement, and (c) behavioural engagement.

H2: Satisfaction of the need for autonomy has a positive impact on (a) cognitive engagement, (b) emotional engagement, and (c) behavioural engagement.

H3: Satisfaction of the need for relatedness has a positive impact on (a) cognitive engagement, (b) emotional engagement, and (c) behavioural engagement.

H4: Self-efficacy has a positive impact on (a) cognitive engagement, (b) emotional engagement, and (c) behavioural engagement.

As previously noted, engagement has been found to be a robust predictor of students' learning (Fredricks et al., 2004; Reeve, 2013). Connell and Wellborn (1991) found that teachers' reports of students' engagement in school were directly related to academic achievement and grades. Similarly, academic and behavioural engagement in high/secondary school were associated with greater achievement and decreased likelihood of dropping out of school (Fall and Roberts, 2012). Similarly, previous research has associated cognitive, emotional, and behavioural engagement with important academic outcomes, such as academic achievement (Fredricks et al., 2004) and satisfaction (Filak and Sheldon, 2008).

Previous studies have suggested that business simulation games help students to develop various skills (Borrajo et al., 2010; Doyle and Brown, 2000). These skills can be divided into generic competences, such as analysing information, decision making, team-working, problem solving and communication skills (Borrajo et al., 2010; Fitó-Bertrán et al., 2014; Loon et al., 2015; Pasin and Giroux, 2011); and specific managerial competencies, such as running a company, understanding the relationships between business units and developing strategies (Borrajo et al., 2010; Fitó-Bertrán et al., 2014).

Therefore, we hypothesise that students' cognitive, emotional, and behavioural engagement while playing business simulation games is positively associated with skills development (i.e. generic competences), and perceived learning (i.e. specific managerial knowledge).

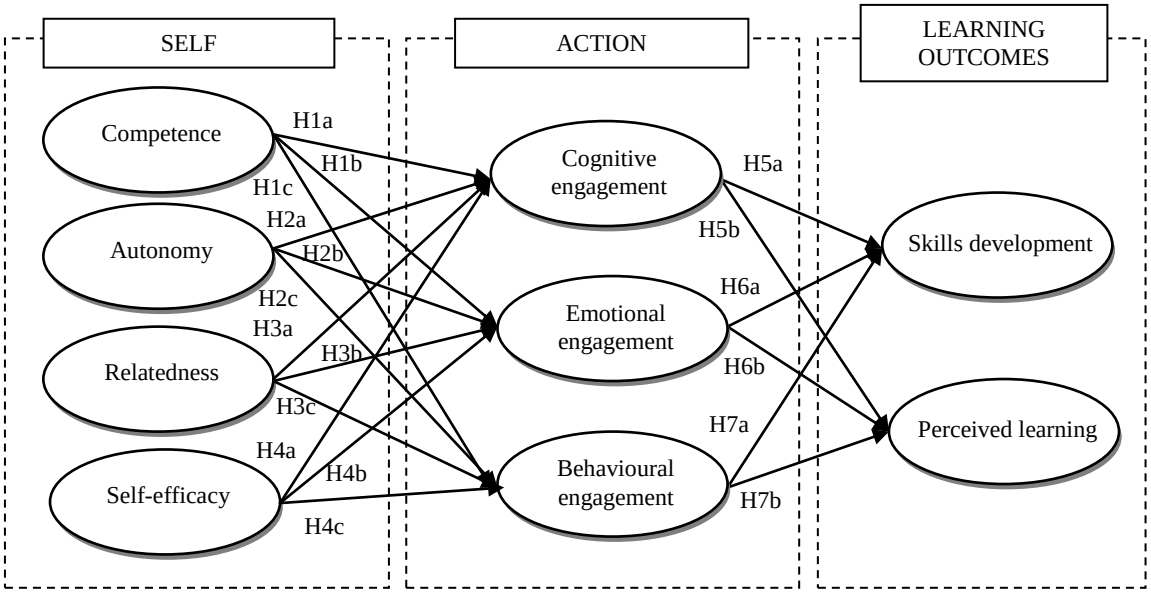
H5: Cognitive engagement has a positive impact on (a) skills development, and (b) perceived learning.

H6: Emotional engagement has a positive impact on (a) skills development, and (b) perceived learning.

H7: Behavioural engagement has a positive impact on (a) skills development, and (b) perceived learning.

Figure 1 presents the proposed model underlying this research.

Figure 1. Proposed model



4. Methodology

4.1. Data collection and participants

The study was carried out in the business faculty of a major Spanish university. The participants were final year students who played a business simulation game in a semester-long marketing course. Data were collected through a self-administered questionnaire at the end of the semester, after the last gaming session. Data from two academic years (2015-16 and 2016-17) were included in the study. Participation was voluntary, and the anonymity and confidentiality of data were guaranteed for the 360 students who answered the questionnaire.

4.2. Procedure

This study employed a business simulation game developed by the Spanish simulation developer Gestionet S.L. During the first sessions, the students were taught the objective and operation of the business simulation game and how to use the software. After familiarising themselves with the simulation game, students were divided into teams of 4-6 members. Each team was in charge of managing a company to compete against companies run by other students. The game included ten rounds of decision-making.

The students had to manufacture and sell various air-conditioning products in different markets. Similarly, students had to deal with inventory, quality control, outsourcing,

purchasing of new machinery and human resources management. The students also had to make decisions on marketing areas, such as pricing, distribution, and media planning, and to manage the company's finances.

Based on decisions made and results obtained, the simulation game gave a total score to each group, up to maximum of 1,000 points. This score was complemented with feedback received about market share, from positioning studies and financial statements, among other reports. Based on all this information, the students evaluated their strategy and recalibrated it for the following round.

4.3. Measurement instrument

To measure the constructs included in the model, we employed well-established scales taken from previous literature. The need for competence, autonomy and relatedness were measured using the *Player Experience of Need Satisfaction* (PENS) scale, developed by Ryan et al. (2006). The specific items were adapted from Neys et al. (2014), who applied the PENS scale in a videogame setting. The measures of self-efficacy were adapted from the *Motivated Strategies for Learning Questionnaire*, developed by Pintrich et al. (1991). Cognitive engagement was measured following the *Metacognitive Strategies Questionnaire* (Wolters, 2004) and emotional and behavioural engagement were measured in accordance with Reeve (2013). To measure skills development, we selected various – decision making, working under pressure, teamwork and applying theory into practice – which had been highlighted in previous studies as the most important skills acquired when playing business simulation games (Borrajo et al., 2010; Fitó-Bertrán et al., 2014; Loon et al., 2015). Finally, perceived learning was measured using items from Tiwari et al. (2014), assessing students' perceptions about how helpful the business game is in helping them understanding the integration of business functions, the analysis of competitive advantages, target markets, or product positioning. 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 the measures.

Table 1. Constructs, items, and measurement model results

Constructs and items	FL	CR	AVE
Competence		0.949	0.862
COM1.I feel competent at the business game	0.927		
COM2.I feel very capable when playing the business game	0.938		
COM3.I feel effective in the business game	0.920		
Autonomy		0.906	0.762
AUT1.I experienced a lot of freedom in the business game	0.847		
AUT2.The business game provides me with interesting options and choices	0.902		
AUT3.I could always find something interesting in the business game to do	0.869		
Relatedness		0.923	0.800
REL1.I find the relationship with my group mates gratifying	0.897		
REL2.I find the relationship with my group mates important	0.909		
REL3.I feel close to my group mates	0.878		
Self-efficacy		0.884	0.717
Before playing the business game...			
SELF1.I believed I would receive an excellent grade	0.871		
SELF2.I was confident I could learn interesting concepts	0.851		
SELF3 I expected to do well	0.818		
Cognitive engagement		0.890	0.729
When I am playing the business game…			
COG1.I try to connect it with what I am learning through my degree	0.842		
COG2.I try to make all the decisions fit together and make sense	0.838		
COG3.I try to relate what I am learning to what I already know	0.880		
Emotional engagement		0.889	0.667
EMO1.I feel good	0.807		
EMO2.I feel interested	0.815		
EMO3.I have fun	0.860		
EMO4.I feel involved	0.784		
Behavioural engagement		0.885	0.720
BEH1.I try hard to do well in the game	0.890		
BEH2.I participate in group discussions	0.857		
BEH3.I listen very carefully to the teacher	0.795		
Skills development		0.907	0.660
SD1.Decision-making	0.846		
SD2.Working under pressure	0.817		
SD3.Teamwork	0.827		
SD4.Applying theory in practice	0.802		
SD5.Adapting to new situations	0.769		
Perceived learning		0.928	0.763
PL1.The business game helped me to understand the integration of business functions	0.868		
PL2.The business game helped me to understand how to analyse competitive advantages for a business	0.878		
PL3.The business game gave me a thorough understanding of target markets	0.867		
PL4.The business game gave me a thorough understanding of product positioning	0.882		

Note: FL: Standardized factor loading; CR: Composite reliability; AVE: average variance extracted.

5. Results

The hypotheses were tested using partial least squares (PLS). SmartPLS 3.0 software was used (Ringle et al., 2015). In comparison to other structural equation modelling methods, such as the covariance-based structural equation method, PLS, a variance-based structural equation method, is more suitable when the focus is on prediction and theory development (Reinartz et al., 2009) and, as in our case, the conceptual model is complex and includes various indicators and latent variables (Chin, 2010; Hair et al., 2011).

5.1. Measurement model

We first assessed the reliability and validity of the constructs. Table 1 shows that all standardised factor loadings were above 0.7 (Carmines and Zeller, 1979), which suggests that individual item reliability was adequate. Moreover, all the constructs were internally consistent, as the composite reliabilities were above 0.7 (Nunnally and Bernstein, 1994). In addition, the constructs met the convergent validity criteria, as the average variance extracted (AVE) values were greater than 0.5 (Fornell and Larcker, 1981). Finally, as shown in Table 2, discriminant validity was also supported. In all cases, the square root of the AVE was greater than squared inter-constructs correlations (Fornell and Larcker, 1981).

Table 2. Discriminant validity

	M	SD	1	2	3	4	5	6	7	8	9
1. Competence	5.51	1.03	**0.928**								
2. Autonomy	5.51	0.95	0.546	**0.873**							
3. Relatedness	6.28	0.82	0.341	0.449	**0.895**						
4. Self-efficacy	5.73	0.87	0.243	0.423	0.290	**0.847**					
5. Cognitive Eng.	5.66	0.81	0.434	0.484	0.380	0.350	**0.854**				
6. Emotional Eng.	5.82	0.79	0.602	0.645	0.482	0.408	0.585	**0.817**			
7. Behavioural Eng.	6.14	0.76	0.408	0.508	0.527	0.396	0.669	0.520	**0.849**		
8. Skills development	5.61	0.87	0.502	0.612	0.450	0.399	0.492	0.700	0.601	**0.812**	
9. Perceived learning	5.45	0.94	0.462	0.617	0.378	0.510	0.446	0.583	0.473	0.729	**0.874**

Note: M: mean; SD: standard deviation; Values on the diagonal are the square root of AVEs. Off-diagonal elements are the correlations among constructs.

5.2. Structural model

The proposed model was then tested. To assess the significance of the path coefficients, a bootstrapping procedure with 5,000 subsamples was employed. The satisfaction of the need for competence, autonomy and relatedness and self-efficacy accounted for 31.9% of the variance of cognitive engagement, 55.2% of the variance of emotional engagement and 40.8% of the variance of behavioural engagement. Similarly, the model explained 39.6% of the variance of skills development and 35.8% of the variance of perceived learning. The Stone-Geisser test criterion (Q^2) exceeded the threshold of 0 for all the dependent variables, supporting the model's predictive relevance.

The results indicate that satisfaction of the need for competence while playing business simulation games was positively and significantly associated with players' cognitive ($\beta = 0.217$; $t = 3.108$), emotional ($\beta = 0.328$; $t = 7.178$) and behavioural engagement ($\beta = 0.136$; $t = 2.480$), supporting H1a, H1b, and H1c respectively. Similarly, as proposed in H2a, H2b, and H2c, the satisfaction of the need for autonomy had a positive and significant influence on players' cognitive ($\beta = 0.229$; $t = 3.317$), emotional ($\beta = 0.325$; $t = 6.545$) and behavioural engagement ($\beta = 0.208$; $t = 3.675$). The satisfaction of the need for relatedness also had a positive and significant impact on players' cognitive ($\beta = 0.158$; $t = 2.811$), emotional ($\beta = 0.184$; $t = 4.299$) and behavioural engagement ($\beta = 0.335$; $t = 6.291$), supporting H3a, H3b, and H3c respectively. The results also show that the players' self-efficacy had a positive and significant influence on their cognitive engagement ($\beta = 0.154$; $t = 2.996$), emotional engagement ($\beta = 0.137$; $t = 3.065$) and behavioural engagement ($\beta = 0.177$; $t = 3.630$). Therefore, H4a, H4b, and H4c were also supported.

Regarding the influence of players' engagement on their learning outcomes, the results show that players' cognitive engagement positively influenced both their skills development ($\beta = 0.171$; $t = 2.371$) and their perceived learning ($\beta = 0.136$; $t = 2.098$), supporting H5a and H5b. The players' emotional engagement with the business simulation game also predicted their skills development ($\beta = 0.425$; $t = 6.247$) and their perceived learning ($\beta = 0.462$; $t = 6.948$). Therefore, H6a and H6b were supported. However, contrary to our predictions, the players' behavioural engagement did not have a significant effect on their skills development ($\beta = 0.108$; $t = 1.616$) or their perceived learning ($\beta = 0.059$; $t = 0819$), so H7a and H7b are rejected.

Table 3 presents the results of the structural model.

Table 3. Structural model results

	Hypothesis	β	t-value	Supported
H1a	Competence → cognitive engagement	0.217	3.108**	Yes
H1b	Competence → emotional engagement	0.328	7.178**	Yes
H1c	Competence → behavioural engagement	0.136	2.480**	Yes
H2a	Autonomy → cognitive engagement	0.229	3.317**	Yes
H2b	Autonomy → emotional engagement	0.325	6.545**	Yes
H2c	Autonomy → behavioural engagement	0.208	3.675**	Yes
H3a	Relatedness → cognitive engagement	0.158	2.811**	Yes
H3b	Relatedness → emotional engagement	0.184	4.299**	Yes
H3c	Relatedness → behavioural engagement	0.335	6.291**	Yes
H4a	Self-efficacy → cognitive engagement	0.154	2.996**	Yes
H4b	Self-efficacy → emotional engagement	0.137	3.065**	Yes
H4c	Self-efficacy → behavioural engagement	0.177	3.630**	Yes
H5a	Cognitive engagement → skills development	0.171	2.371*	Yes
H5b	Cognitive engagement → perceived learning	0.136	2.098*	Yes
H6a	Emotional engagement → skills development	0.425	6.247**	Yes
H6b	Emotional engagement → perceived learning	0.462	6.948**	Yes
H7a	Behavioural engagement → skills development	0.108	1.616	No
H7b	Behavioural engagement → perceived learning	0.059	0.819	No

Note: * $p < 0.05$; ** $p < 0.01$.

6. Conclusions

Engagement in the academic context has captured great attention among scholars and educators. However, there is a need to investigate further the factors that influence students' engagement while playing business simulation games. With the aim of addressing this gap, this study draws on the self-system model of motivational development (Connell and Wellborn, 1991; Skinner et al., 2008) to analyse the impact of students' perceptions of competence, autonomy, relatedness and self-efficacy, while playing business simulation games, on their cognitive, emotional and behavioural engagement and the influence of engagement on students' skills development and perceived learning.

The results of the empirical study provide strong support for the use of business simulation games as a tool to promote engagement among undergraduate business students. Overall, these findings confirm that self-system processes are essential for the development of greater engagement. More specifically, the findings reveal that students' perceptions of competence and autonomy while playing business simulation games have a positive impact on their cognitive, emotional and behavioural engagement,

which is in line with previous studies (Dupont et al., 2014; Skinner et al., 2008). In addition, this study advances prior research that had found that perceptions of relatedness are associated with emotional and behavioural engagement (Shen et al., 2012; Skinner et al., 2008), finding also a positive impact on cognitive engagement. Likewise, the findings provide support for the relationship between students' perceptions of self-efficacy and all dimensions of engagement. In particular, the findings show that satisfying the need for competence influences fundamentally the cognitive and emotional dimensions of engagement, as does the need for autonomy. However, the need for relatedness and perceptions of self-efficacy have more impact on the behavioural dimension of engagement.

Several studies have analysed the impact of engagement on different learning outcomes, such as grades (Connel and Wellborn, 1991), academic achievement (Fredricks et al., 2004), or satisfaction (Filak and Sheldon, 2008), Our results advance previous research by providing insights into the effects of each dimension of engagement on skills development and perceived learning. Our findings show that students' cognitive and emotional engagement positively impact on their skills development and perceived learning. In particular, the emotional engagement dimension had the greatest impact of both outcomes, suggesting that being involved with the game and experiencing fun are the main determinants of the success of business simulation games. Finally, although previous research has highlighted the link between behavioural engagement and success in school (e.g., Skinner, 2016), our findings do not provide support for the relationship between behavioural engagement, skills development and perceived learning. An explanation for this could be that students who participated in the study showed higher scores for behavioural engagement than for cognitive and emotional engagement (see Table 2), and with lower deviation. Given that the business simulation game was played in the classroom, they all tried to do well, participated in group discussions and paid attention to the teachers' instructions and comments. Thus, the variation in their perceptions of learning gains and skills development was not a consequence of their behavioural engagement.

This study makes a number of theoretical contributions. First, we analyse the impact of individual factors on engagement in the context of business simulation games and shed new light on the processes that promote engagement in undergraduate students. In addition, to respond to the call for more research into the factors that contribute to the

success of business simulation games (Matute and Melero, 2016), this study proposes a framework based on the self-system model of motivation development to analyse the engagement experienced by students while playing business simulation games. Finally, while most previous engagement studies have not considered the multifaceted nature of the construct (Wang and Peck, 2013), and only a few have focused on higher education (Zumbrunn et al., 2014), this study analyses cognitive, emotional and behavioural engagement in the higher education context.

The findings of our research have a number of implications for the design of business simulation games aimed at engaging students in the learning experience. We have concluded in this study that, in order to be engaged, it is important that students feel a sense of competence, autonomy, relatedness and self-efficacy while playing. To promote the experience of these self-system processes, prior studies have recommended the application of different game design elements. For instance, Xi and Hamari (2019) showed that achievement-related elements (e.g., points, leaderboards, progress graphs, etc.) are associated with higher levels of competence and autonomy. Therefore, it is recommended that business simulation games provide students with points at the end of each simulation to see their performance, leaderboards to compare their score to those of other players, and performance graphs that give them information about their progress over time. Similarly, Sailer et al. (2017) also showed that gamified systems with leaderboards and performance graphs foster competence and autonomy. Likewise, the need for relatedness has been associated with teammates (Sailer et al., 2017). Thus, business simulation games should be designed in groups of students that work together towards a shared objective. Besides cooperation, the need for relatedness has also been related to social competition (Xi and Hamari, 2019). In this regard, it would be beneficial to design business simulation games so that they can create friendly competition among groups of students to generate a sense of belonging (van Roy and Zaman, 2018). Finally, the activities that the players undertake as part of the games should be designed to provide students with a sense of self-efficacy.

As with any research, this study has limitations. First, the self-system model of motivational development suggests that motivational systems are organised around engagement and disaffection (Connell and Wellborn, 1991; Skinner et al. 2008). However, this study focuses on the analysis of different dimensions of engagement. Therefore, future research should also include measures of disaffection. Secondly, this

research focuses on the study of personal factors as variables predicting engagement. However, previous studies have also identified contextual factors, such as autonomy support, goal structures, relationships with teachers and peers, the provision of structure and involvement (Connell and Wellborn, 1991; Skinner et al., 2009a). Therefore, future studies should analyse contextual variables. Thirdly, the model establishes that there are reciprocal effects between engagement and self-system beliefs. It would be interesting to analyse these reciprocal effects over time. Finally, students' learning was measured based on their perceptions (opinions) of learning. Thus, future research should also include other measures of learning, such as retention or transfer learning, measured objectively (e.g., students' grades, application tests) to further explore whether business simulation games influence learning.

Conflict of Interest Statement

The authors declare no conflict of interests. Data will be available on request.

Ethics Statement

The authors declare that they have taken steps to protect the participants, ensuring that they were not disadvantaged and that the data have been anonymised.

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