



Article

Seriously Playful Business: Game-Based Learning at Work

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Abstract

Play and the pursuit of entertainment are inherently human behaviors. Such behaviors extend to the work environment. This study explores how game-based learning influences learning engagement in professional settings, with a focus on digital marketing education. The goal is to evaluate the effectiveness of serious games in enhancing learner engagement, strategic thinking, and teamwork. The study focuses specifically on The Ecommerce Game, a serious game that helps players learn about digital marketing concepts, develop teamwork skills, improve strategic decision making, and acquire a long-term focus. Grounded in Keller's ARCS model of motivation (attention, relevance, confidence, and satisfaction), the study uses fuzzy-set qualitative comparative analysis (fsQCA) to assess how the ARCS elements contribute to motivation during learning. The study highlights the importance of instructor presence and player-instructor interaction in fostering engagement. The findings suggest that serious games offer an effective and scalable tool for training and skills development in digital marketing and similar professional domains.

1. Introduction

Playing and seeking entertainment are inherently human pursuits. From early childhood, even before walking, humans use games to find their inner well-being and invest much of their time in play [1]. Playing is so intrinsic to human nature that there is even evidence that primates play games. Human beings are essentially playful creatures [2], and board games have been found to exist in the earliest societies, across different regions and historical periods [3].

Perhaps surprisingly, something as natural to humans as amusement and entertainment has had a complex relationship with work and the professional environment since the industrial revolution and up to the beginning of the 21st century [4]. Different social and academic reports support this idea [5–7]. However, learning can be fun, and formal learning contexts can be made more enjoyable. Among their myriad benefits, gameful experiences motivate users to connect with an organization's learning processes [8,9]. This feature of games is particularly relevant in professional settings, where engaging employees in continuous training and skills

development presents unique challenges and opportunities, demanding effective and motivating pedagogical approaches. In this context, the term *professional environment* refers to structured, job-related training settings where employees engage in upskilling activities. Unlike formal education, these environments are shaped by practical constraints such as limited time, varying levels of digital readiness, and the need for immediate applicability, which pose unique challenges for learning design.

This study refers to game-based learning (GBL) as an overarching pedagogical approach. Within this framework, gamification refers to the use of game elements in non-game contexts (Deterding et al., 2011). Games can be created specifically to facilitate learning, rather than entertainment. Such games are known as serious games [14,15]. The term serious reflects not only the educational intent of these games but also their application in professional or institutional settings such as work, training, education, healthcare, and the military [16]. Although the current study focuses on a physical board game, the broader literature on digital game-based learning (DGBL) is also relevant and informative [10–12], highlighting numerous benefits in terms of learning outcomes [13].

According to Susi et al. [17], serious business games can be used in a wide range of training environments, benefiting learners from children to employees. Furthermore, scholars have explored how game-based learning supports different dimensions of engagement, including affective, behavioral, cognitive, and sociocultural engagement [10,18,19]. The aim of this study is to examine the impact of serious games on professional learners' engagement in digital marketing training, using Keller's ARCS (attention, relevance, confidence, and satisfaction) model.

The literature generally focuses on the benefits of game-based learning through digital games in educational settings. Camacho-Sánchez et al. [20] used Keller's ARCS model [28] to show that using digital games to teach highly theoretical thematic concepts can effectively improve learner motivation. Their study focused primarily on specific types of video games and online interactions, neglecting other game dynamics such as face-to-face play. Therefore, it would be of interest to explore whether the ARCS model also works to motivate professionals to learn in face-to-face play. The present article continues along these lines [20].

The application of serious games has grown because of the advantages they offer. For example, they can reduce the anxiety of making mistakes or poor decisions because they focus on learning by cause and effect instead of by rote. They thus allow learners to apply the knowledge they have acquired in class and create a link between theory and practice [11,15,19–21]. They offer experiential learning, or learning by experiencing, where learners develop competencies that cannot be achieved and enhanced solely through knowledge transfer but instead require practice in real-life situations [22]. Numerous studies have also examined the application of business games in corporate settings [23]. In such environments, business games foster productivity and creativity among employees of different ages [24,25]. Bilge and Severengiz [15] argued that serious games increasingly play a key role in motivating employees to develop their work competencies.

Although prior research has extensively addressed game-based learning in educational settings, few studies have empirically examined its application in professional development environments, particularly in the field of digital marketing. This study aims to address that gap by analyzing motivational configurations (based on Keller's ARCS model) that foster the learning engagement of professional participants using a serious game. The aim is to uncover how combinations of attention, relevance, confidence, and satisfaction lead to engaged learning. It is hoped that the study can enrich the understanding of game-based learning in professional environments as part of employee training.

The study aims to show whether employees find game-based learning an attractive and useful way of acquiring and developing digital marketing concepts. This study contributes to the existing literature by analyzing how learning engagement is perceived and experienced in

professional environments where game-based learning is applied, an area that remains underexplored in applied training contexts. Based on fundamental criteria [26] referring to clear objectives based on prior learning, challenges, and feedback, four factors that reinforce the external motivation of individuals were chosen: attention, relevance, confidence, and satisfaction [27]. These factors have been widely used given their basis in the ARCS model [28,29]. Through this form of learning, employees are expected to develop their grasp of concepts and thus adapt to the changing environment, which calls for new approaches and solutions aligned with long-term sustainability.

Although the ARCS model itself is well established in the serious games community, this study's contribution lies in its detailed empirical analysis within a specific professional training scenario (digital marketing upskilling for active professionals) and its use of a configurational approach (fuzzy-set qualitative comparative analysis, or fsQCA) to uncover the specific combinations of ARCS factors that effectively drive learning engagement in this context. This focus on practical application, specific context, and nuanced motivational pathways offers valuable insights for *IJSG* readers interested in evidence-based design and evaluation in diverse settings, including the workplace.

To achieve the research aims, the concept of game-based learning is introduced, and its importance is highlighted. Next, a literature review of the ARCS model [28] is provided, linking it to the concept of learning engagement proposed by Idrissi et al. [27]. The next section explains the serious game developed by the research team and the methodology. Next, the findings are described and linked to the theory. Finally, conclusions, limitations, and future lines of research are provided.

The literature discusses the potential of commercial video games to help develop employability skills. For instance, Barr [30] showed that playing commercial video games can have a positive influence on the development of communication skills, adaptability, and resourcefulness in adults. Subsequently, Barr [31] described the value of video games such as *World of Warcraft* and *Minecraft* for educational purposes to develop graduate skills related to employability.

In sum, the aim of this study is to identify and analyze the motivational factors that foster learning engagement through a serious game in professional contexts. Using the ARCS model [28], the study applies a configurational approach to uncover combinations of conditions that lead to high engagement among employees in digital marketing training.

2. Theoretical Framework

This section reviews the literature on the ARCS model [28] and links it to the concept of learning engagement [27].

2.1 The ARCS Model

The ARCS model [28] is an instructional design model that focuses on increasing learners' intrinsic motivation. Grounded in expectancy-value theory, it assumes that individuals are intrinsically motivated when a task not only aligns with their needs but also offers a realistic opportunity to satisfy them. In this review, motivation is considered to have four components: attention, relevance, confidence, and satisfaction. This conceptualization is supported by prior research, which has shown that instructional strategies aligned with these components can significantly enhance learners' engagement and performance [32,33].

Attention is defined as a person's response to the stimuli perceived in training materials [28]. To attract and retain learners' attention, training should be designed in such a way that stimuli are present from the beginning and are maintained throughout the learning process [28]. Mayer [34] indicated that appropriately designed learning materials can help capture people's

attention. In this context, attention consists of stimulating and maintaining people's curiosity using different techniques such as challenges, scoring systems, and games with different levels of play. An individual's attention can also be maintained or enhanced by including audio or multimedia elements [35].

Organization in games and the initial explanation of content leads players to express a positive perception of games and activates their attention [27]. For example, Idrissi et al. [27] found that, to capture people's attention, game-based learning must have an initial attention-grabbing element, organized information, a variety of activities, phases, images, and so on, and an attractive design and game style.

Proposition 1: Serious games that manage to capture and hold the attention of participants positively influence learning engagement.

The second component is relevance. On a general level, relevance refers to all elements that people perceive can help them achieve their personal goals and needs [36]. In learning, relevance is powerful because it influences the motivation to learn. In general, people are more motivated to learn if they perceive that the new knowledge or skills they are learning will help them achieve a short- or long-term goal.

In short, relevance is critical for the success of the learning process. If adults do not perceive that the games they play have personal value or meaning [27], they are less likely to learn or feel motivated to participate [36]. Therefore, educators and game designers should consider relevance when designing and developing educational games for adults.

Proposition 2: Serious games that are perceived as relevant by participants positively influence learning engagement.

Confidence is the positive expectancy that a person experiences at a particular time [37]. Social cognitive theory [38] suggests that there is a relationship between an individual's self-efficacy and self-confidence. The reason is that self-efficacy refers to the confidence of individuals in their own abilities to execute actions with a desired outcome.

In relation to learning, confidence is associated with believing oneself capable of understanding the intellectual challenge posed [39]. Through game-based learning, individuals create positive expectations about their performance in the learning task [40]. It has been shown that the use of educational games can improve players' self-efficacy and self-confidence in various areas, including problem solving and decision making [37].

Studies have also shown that employees who are positive are more likely to be professionally and personally successful at work, and employees with self-confidence tend to set ambitious goals that allow them to develop their leadership skills [41,42]. In clinical professions, studies have looked at how gaming improves clinical competence and confidence in specific skills such as problem solving, increasing self-confidence, reducing monotony, and making people part of active learning [43].

In games themselves, feedback is essential. By progressing through games, players gain rewards, and achievements become tangible and linked to high performance. These features develop players' self-confidence [44]. Studies have shown that participants who received immediate feedback after completing a problem-solving game increased their confidence in their problem-solving abilities and boosted their motivation and participation [45]. A well-designed game that provides adequate challenges and effective feedback can increase players' confidence in their ability to learn and apply skills and knowledge [46].

Proposition 3: Serious games that build participants' confidence positively influence learning engagement.

Lastly, satisfaction is an attitude or emotional state toward a task or, in this case, a game. It is influenced by various situational factors [47,48]. If people feel satisfied with the learning

process, they are more likely to be actively engaged and motivated to continue learning. Conversely, if they do not feel satisfied with the learning process, they are more likely to lose interest and become disengaged.

There seems to be a relationship between satisfaction and learning engagement in play-based learning. Play can develop motivation and interest in learning, as well as fostering key social and emotional skills [49]. Furthermore, games can be effective in improving the satisfaction of participants because they become protagonists of their own learning and receive immediate feedback, which increases motivation.

Proposition 4: Serious games that provide participants with satisfaction positively influence learning engagement.

2.2 Engagement in Learning

Following Newmann [50], engagement is defined as psychological investment and effort in learning and developing the knowledge and skills targeted by education [51]. When players feel more included, they spend more time engaged in learning and less time trying to understand the system. This inclusion and engagement promotes participation among individuals [52]. Game-based learning therefore uses playful elements to help people feel connected to the subject matter. Through these connections, motivation is enhanced and users become engaged in making lasting changes. However, intrinsic motivation and rewards may be inversely related because, with lower intrinsic motivation, it has been shown that rewards can demotivate individuals in the long run in terms of their learning engagement [32,53].

Learning engagement encompasses aspects of behavioral, emotional, and cognitive behavior [54,55]. Behavioral engagement refers to adherence to organizational norms and structures that players experience through participation in learning and play. Emotional engagement refers to the bond created by interactions among instructors and learners and the effects on their emotions. It is a feeling of belonging or interest and curiosity [56]. Cognitive engagement refers to investment in solving problems and developing skills [57,58], as well as a preference for challenges or intrinsic motivation [56]. Studies have shown a strong link between motivation, engagement, and learning. This finding reflects theories about the idea that motivated and engaged individuals are more likely to achieve meaningful learning outcomes [59,60].

3. The Ecommerce Game

This section provides a detailed description of the game used in the study. The design of The Ecommerce Game explicitly incorporates the four ARCS components [28]. Attention is maintained through time-limited decisions and randomized events via market cards. Relevance is ensured through realistic business scenarios and KPIs. Confidence is built via feedback loops and progress checkpoints. Satisfaction is delivered by competitive success and peer interaction [29]. These elements ensure alignment between game mechanics and motivational outcomes.

The Ecommerce Game was developed as a pedagogical tool to practice decision making in digital business environments. The game is structured around the top-of-the-funnel (TOFU), middle-of-the-funnel (MOFU), and bottom-of-the-funnel (BOFU) marketing stages. Part of the description of the game mechanics has previously been published by Calza-Perez et al. [61], who applied the game in an academic setting. In this study, the application of the game was adapted to a professional training context.

3.1 Application of The Ecommerce Game

Unlike prior research [61], which has tested the use of the game in university settings, this paper explores its impact on employee training through a configurational fsQCA approach. This serious game was originally developed as part of e-commerce courses at the undergraduate and postgraduate levels. However, it is also applicable in professional settings. Although some game sessions were held in business schools, all participants were professional employees of companies, not students. These sessions were structured as professional development events, ensuring full alignment with the study's focus on game-based learning in workplace contexts.

3.2 Purpose of The Ecommerce Game

The Ecommerce Game was created for e-commerce learning purposes from the perspectives of marketing and entrepreneurship, targeting both professionals and marketing students. The game aims to enhance players' understanding of key e-commerce concepts and the way they are applied in the real world through a playful and participatory approach.

Players take on the role of new entrepreneurs who have created their first startup in the healthy food sector and are beginning to explore e-commerce. The goal is to make an e-commerce venture profitable within one year. The game has 12 rounds, each symbolizing a month in the life of the e-commerce business. To reflect the reality of new entrepreneurs, resources are limited. Participants start with 12,000 euros in tokens, which they must manage carefully to last until the end game, receiving four payouts after Rounds 3, 5, 9, and 12. The winner is the player who, after receiving the final payout after Round 12, has the most tokens, including those collected and those in the player's possession.

3.3 Structure of The Ecommerce Game

Figure 1 shows the three major blocks of the game. This funnel model is widely used in digital marketing strategy and education [62, 63]. It serves as a conceptual basis to help players channel their strategy throughout the customer journey.

3.3.1 Top of the Funnel (TOFU)

The objective in the first block of the game (TOFU) is to generate web traffic to the e-commerce site through various traffic channels and the social media ecosystem. This stage of the sales funnel focuses on attracting new visitors to the e-commerce website and converting them into leads or potential customers by delivering relevant and engaging content [64].

To achieve this goal, players must use appropriate digital marketing strategies for each traffic channel. These strategies include search engine optimization (SEO), online advertising through search engine marketing (SEM), content marketing, e-mail marketing, and social media. They must consider the specific features of each channel in relation to the target market to offer relevant high-quality content that can capture the attention and interest of visitors.

Generating web traffic is fundamental for the success of an e-commerce business. Therefore, it is one of the core goals of the digital marketing strategy of such companies. The game provides a useful and effective tool for players to acquire knowledge and skills in the use of different digital marketing techniques aimed at generating web traffic in the initial phase of the sales funnel.

3.3.2 Middle of the Funnel (MOFU)

In the second block of the game (MOFU), the objective is to improve the e-commerce conversion rate by optimizing the user experience, removing potential barriers to purchase, and building trust in the sales process. This phase of the funnel focuses on maximizing the value perceived by potential customers and reducing the uncertainty associated with purchasing by

implementing marketing strategies and techniques focused on improving the user experience and optimizing the e-commerce checkout process [65].

3.3.3 Bottom of the Funnel (BOFU)

In the last block of the game (BOFU), players aim to increase the average sales ticket through loyalty and cross-selling or upselling techniques. The aim is to consolidate the relationship with customers and increase their loyalty to the brand by offering complementary products and additional purchase suggestions that add value and satisfy their needs and desires. Various marketing strategies and techniques are employed. These techniques are focused on fostering customer loyalty and maximizing the long-term value provided by e-commerce [66].

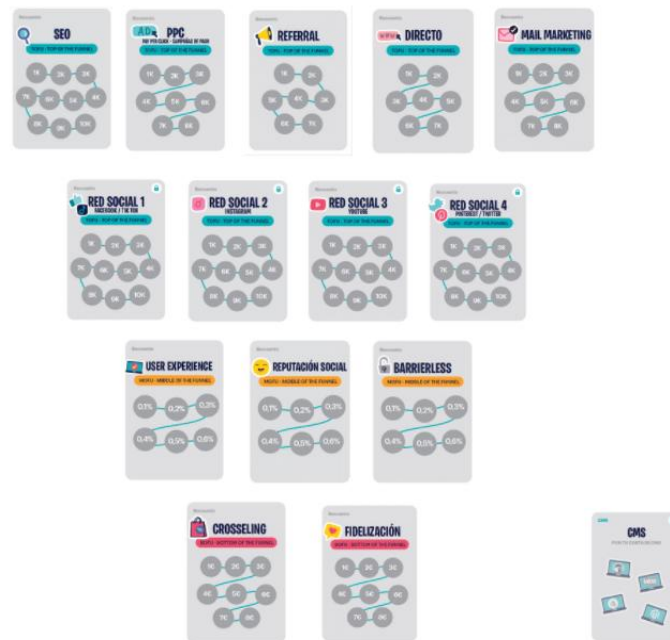


Figure 1. The Ecommerce Game

4. Methods and Material

This study followed a fuzzy-set qualitative comparative analysis (fsQCA) approach. This form of analysis adopts a complex causation perspective by considering asymmetric relationships between observations [67] to find conditions that are sufficient or necessary to cause an outcome. It uses a set of empirical cases to show the combinations of conditions that lead to an outcome, which, in this study, was learning engagement through serious play. The results reveal several combinations of factors, called configurations, that are minimally necessary or sufficient to cause the outcome of interest [68,69].

This method is useful when causality is complex and when different conditions produce identical results. Regression coefficients show the impact of variables but do not indicate the extent to which individual variables are sufficient for all cases when high or low values of any variable are neither sufficient nor necessary for a high or low value of the outcome [70]. A necessary condition means that the outcome can only occur if that condition is present. A sufficient condition means that the condition always leads to the outcome [71]. This methodology enables deep empirical and theoretical examination of the factors that affect an outcome of interest.

4.1 Sample, Data Collection, and Measures

A data set was created by gathering data at multiple events in which employees of companies in the region of Valencia (Spain) played The Ecommerce Game. These events were dubbed *The Ecommerce Challenge*. The participants in this study were active professionals representing the current industrial landscape in the Region of Valencia, Spain. Most participants came from key industries in the region, including the textile, leather, and footwear industries, primarily represented at the event held in Alcoi. Professionals from the ceramics industry participated in the event organized at a regional chamber of commerce. Representatives from the manufacturing, machinery, and metal industries attended the events hosted in Valencia, the regional capital. Teams representing different companies competed against each other in games between four teams. Participants were 76 professionals from 45 companies, spanning a variety of sizes and industries. They had professional roles that were directly or indirectly related to marketing. During the game, the participating teams applied their skills and knowledge of marketing, sales, and e-commerce strategies to achieve the highest possible sales and profits. The professional environment allowed participants to experience situations and challenges similar to those they might face in their day-to-day work.

All participants were recruited from companies that had confirmed their participation in the training events. These companies were initially identified using professional databases and institutional mailing lists from local business associations and the collaborating business schools. Selection prioritized well-established firms because the training targeted professionals with established roles in marketing and digital strategy. The process was carried out through institutional communication channels. Participation was entirely voluntary. Before starting, each participant signed an informed consent form outlining the objectives of the study, data handling procedures, and confidentiality assurance, in line with the General Data Protection Regulation (GDPR). The study was conducted in professional settings, and participation was restricted to invited and pre-registered individuals. Therefore, bystanders or passersby were not permitted to join spontaneously. The objective of these events was to foster practical learning and interaction among the participating teams, while providing a unique marketing and e-commerce experience.

Once the participants finished the game, they completed a questionnaire measuring their learning engagement as an outcome based on the dimensions of attention, relevance, confidence, and satisfaction. Validated scales [72,27] were used for this purpose. The final sample consisted of 76 employees from different Spanish companies. The sample was sufficiently representative for analysis with fsQCA to provide reliable results. FsQCA is designed for use in studies with small samples, and it is suitable for samples of 10 to 50 cases [71] or more. This process is explained in Figure 2.



Figure 2. Process Outline for Game-Based Learning in The Ecommerce Game

5. Results and Discussion

This section presents the results of the fsQCA. Table 1 shows the names of the conditions as shown in the data coding, along with a description of the measurement of each condition using existing scales [72,73].

Table 1. Description of conditions and outcome

Condition/outcome	Description
_conf	Confidence: Measured in terms of understanding the game and the objective. Also measures confidence in the game's development and the learning acquired.
_aten	Attention: Measured in terms of attention captured by the game thanks to its design, content, fun nature, and dynamism.
_rele	Relevance: Measured in terms of usefulness and applicability of the content.
_satis	Satisfaction: Measured in terms of the satisfaction of achieving objectives and learning.
_comprapre	Engagement in learning (outcome): Measured in terms of learning acquired and level of entertainment.

Using these conditions and outcome, the following learning engagement model was tested:

$$\text{_comprapre} = f(\text{_conf}, \text{_aten}, \text{_rele}, \text{_satis})$$

Following the method described by Ragin [74], calibration was performed to assign values to cases according to their degree of membership to the sets corresponding to the chosen antecedent conditions. Membership values were assigned to cases using a scale ranging from 0 (non-membership) to 1 (full membership), with a crossover point (or point of maximum ambiguity) at the value 0.5 [75]. Subsequently, necessity analysis was performed to identify whether a condition is necessary for the outcome to occur. A necessary condition must have a consistency value greater than 0.9 in the necessity analysis performed in fsQCA 2.0 software [76]. Table 2 shows that no condition was necessary for the outcome. However, the condition attention had the highest consistency value. Therefore, it would seem to be an important condition for the outcome (i.e., for participants' learning).

Table 2. Analysis of necessary conditions

	Consistency	Coverage
_conf	0.698093	0.725370
~_conf	0.589310	0.560122
_aten	0.833468	0.774395
~_aten	0.459307	0.489551
_rele	0.731400	0.751795
~_rele	0.512222	0.491748

Next, the truth table was constructed. The truth table consisted of all possible combinations of conditions or structural configurations [77]. Boolean logic was applied to the table to identify possible combinations associated with learning engagement (shown in Table 3). The sufficiency table shows the three causal configurations leading to the outcome, representing 82% of the empirical cases in the study.

Table 3. Causal configurations leading to outcome

	Raw coverage	Unique coverage	Consistency
_conf*_aten	0.617244	0.0491539	0.818376
_aten*_rele	0.673919	0.112812	0.842795
~_conf*~_rele*_satis	0.334945	0.0684931	0.873249
Frequency cutoff = 1			
Consistency cutoff = 0.80787			
Solution coverage = 0.824335			
Solution consistency = 0.80827			

As shown in Table 3, three configurations lead to the outcome. The first configuration suggests that, for participants to learn through serious play, they must have confidence and attention. Therefore, for players to learn from the game, it must capture their attention and provide stimuli that maintain their attention. Likewise, the game must give confidence to participants, who must trust in their abilities to solve the challenges posed.

In the present case, the game offers all three components of attention [28]. The first is perceptual arousal through curiosity from an unexpected change. In the game, after each round,

a market card is played. This card affects all players either positively or negatively, which makes them attentive to market outcomes and changes applicable to their firm. The second component of attention relates to keeping attention. In the game, participants' attention is kept because the rounds are dynamic and varied. With each decision participants make, they have to pass the card to their competitors. In turn, they receive a new card asking them to make a new decision. The third component of attention is variability, which refers to constant change or new events. In this game, each round gives players new objectives for the business. As the business moves down the conversion funnel, the decisions in terms of direct traffic, conversion rate, and shopping cart optimization change.

Regarding confidence, in Rounds 3, 5, 9, and 12 of The Ecommerce Game, players receive payouts that depend on their decisions. These payouts motivate participants to continue to immerse themselves in the game, trusting in their decisions based on their capabilities. According to multiple sources [44,46], feedback and rewards are a key element in developing the confidence individuals have in their ability to learn. This confidence leads employees to set better goals [42]. Likewise, for a game to be successful, it has to be fluid [78]. Moreover, the challenges posed should not be too complicated or too easy because overly simple or demanding challenges could create anxiety for participants or cause them to lose interest or confidence in their ability to complete these challenges. The Ecommerce Game is fluid and offers intermediate challenges. For instance, after each round, a player draws a market card that, just like in the real environment, affects all companies. Some are affected positively, and others negatively. Others are not affected at all, depending on the decisions they have made. The market card may reward eco-friendly initiatives during gameplay or penalize abusive practices on Google (e.g., through search engine penalties) or low protection from security systems, making each session evolve differently. Players have to make quick decisions before passing the turn to competitors (other participants) and discarding. Hence, each round is fast and varied.

The second configuration suggests that the outcome of learning based on serious play is achieved when participants are attentive and perceive the game to be relevant. Besides being attentive, as described in the previous configuration, participants have to perceive that the game will provide them with new knowledge or skills to help them achieve their goals or grow professionally [79]. The Ecommerce Game is relevant because participants learn new concepts and strategies for digital business.

The third configuration suggests that, to achieve learning based on serious play, neither confidence nor relevance should be present in the game, but there must be satisfaction. As discussed in the literature, if an individual is satisfied with the learning process (in this case, The Ecommerce Game), then that individual is actively engaged in the game and is motivated to continue learning and paying attention. Accordingly, satisfaction is a relevant factor for learning engagement. If the player is satisfied, it triggers elements of learning engagement. As mentioned earlier, although attention is not a necessary condition, it is important for achieving the outcome because it is present in two of the three configurations leading to learning based on serious play.

6. Conclusions

Although no single condition is necessary, attention is a key factor in two of three configurations. This finding suggests that capturing and maintaining the attention of participants in a game is important for the learning process. Therefore, instructors must strike a balance between learning, boredom, and overstimulation through attention [79,80]. Keller [28] also noted the importance of maintaining attention throughout the learning process by activating curiosity and maintaining this curiosity through challenges, questions, or problems.

The first configuration suggests that confidence is important. It implies that participants should feel confident in their ability to solve the challenges that the game presents. Confidence is related to self-efficacy, which is an individual's belief in the ability to execute actions successfully [37,38]. In play-based learning, individuals who are confident in their abilities tend to have higher self-efficacy in relation to play. Accordingly, they believe that they are capable of understanding and coping with the intellectual challenges posed by the game [38]. Therefore, confidence is intrinsically related to a player's perception of being able to succeed in a game, so the player is more willing to engage actively in the learning process [43].

Relevance is present in the second configuration. It provides motivation to learn because people tend to be more motivated to learn when they perceive that new knowledge or skills will help them achieve personal or professional goals [79,81]. As observed by López-Neira [82] in line with other authors, serious or educational games have an impact on learning by boosting learners' motivation. In game-based learning, relevance is also important. Games that are designed to be relevant to the learning objectives and needs of participants have a greater impact on learning engagement [27].

Satisfaction is relevant too. In the third configuration, satisfaction is an important factor in achieving game-based learning. This finding implies that when participants are satisfied with the learning process and the game itself, they are more motivated and committed to continue learning. Learning engagement, which is influenced by factors such as attention, confidence, and relevance, can lead to greater satisfaction with the game experience [59,60].

This study demonstrates that achieving learning engagement through serious games applied in professional training environments is possible via different configurations of the motivational conditions defined by the ARCS model. Crucially, for workplace learning, the findings suggest that there is no magic solution. Instead, designers must consider specific combinations of the dimensions of the ARCS model (as revealed by the fsQCA) depending on the learning objectives and the professional audience. Attention, relevance, confidence, and satisfaction play key roles. While none of these conditions is necessary on its own, combinations of these conditions can influence the desired outcome of game-based learning in a professional context.

The main objective of The Ecommerce Game is to help participants learn about e-commerce and digital marketing terminology, while familiarizing them with the latest tools to succeed in e-commerce. Through interaction with this serious game, players can explore and experiment with these tools. They can thus develop practical and applicable knowledge in a simulated environment. The Ecommerce Game meets its objectives by achieving engaged learning.

Another important aim of the game is to explain the fundamental relationships in e-commerce to drive sales. It focuses on three key performance indicators (KPIs): traffic (number of visits), conversion rate, and average ticket. Through the game, participants learn how to optimize each of these KPIs and how they interact with each other to achieve high sales. The game thus provides an understanding of key digital marketing concepts and how they apply to the business context.

In addition, the game encourages the development of teamwork skills. Because all decisions must be made quickly and in pairs, players learn to collaborate and communicate effectively. The dynamic and fast-paced nature of the game requires constant decision making, which promotes the ability to think strategically and act quickly in pressure situations. This teamwork experience enhances participants' ability to face challenges and solve problems in a collaborative environment.

Although numerous studies have explored the use of serious games, this study's unique contribution lies in its focus on engagement in digital marketing learning through game-based learning in a highly specific context (industry in Valencia, Spain). Unlike companies that target end consumers, Valencian industrial companies, particularly those whose customers are primarily other businesses, tend to have traditional operations. These industries lag behind in

digital marketing practices, continuing to use predominantly traditional sales channels [83–85]. Given this context, the present study offers valuable insights into how game-based learning can be used to enhance the digital marketing skills of professionals in conservative industries that lag behind current trends.

These findings offer practical implications for designing serious games aimed at professional development. For instance, the sufficient configurations shown in Table 3 (e.g., the importance of combining either attention and confidence or attention and relevance) highlight specific design strategies to target employee engagement in corporate training. The success of The Ecommerce Game in fostering engagement within this specific professional context provides a practical example of how game-based learning can be leveraged for effective upskilling in digital marketing, even in industries that traditionally have a low level of digitization. Likewise, companies can integrate well-designed games into their training programs. Moreover, companies facing barriers to digital transformation can improve employees' learning of complex skills such as digital marketing, ensuring that new employees already have a grasp of basic concepts. As the results show, there is no single formula for achieving engagement. Instead, different combinations of motivational factors can be effective. Hence, designers can adapt the game structure and its motivational elements according to the audience's profile, needs, and learning objectives.

Finally, another aim of the game is to encourage long-term decision making. As players progress through the game, they are challenged to make strategic decisions to maximize the profitability of their e-commerce venture at the end of the game. The game involves considering the long-term impact of actions and adopting a long-term results-oriented approach. The game encourages reflection on the consequences of decisions and the development of planning and resource management skills.

Future lines of research can resolve some of the limitations of the study. For example, learning engagement did not consider the role of instructors and hence the impact of player–instructor interactions [86]. Although the role of the instructor was not explicitly assessed in this study, the learning experience followed a standardized facilitator manual, designed to harmonize delivery across sessions. Future planned developments include the digitization of the game to enable greater control and consistency in learner–instructor interactions. Another limitation is the assumption that players were passive subjects who merely received information during the game. In reality, players proactively contributed to their own learning [58]. Therefore, another future line of research would be to analyze the impact on teamwork engagement when playing The Ecommerce Game, as studied by other authors [60].

This research, which is based on the established ARCS model, is valuable for *IJSG* readers given its detailed description of an empirical study within a specific, arguably under-explored, professional context. Another valuable feature of this research is the use of fsQCA to reveal actionable insights into the complex interplay of motivational factors for adult learners at work. This approach provides evidence on the effective design and implementation of serious games beyond formal education settings.

Another limitation of this study of a specific professional niche is the geographic and industrial scope of the sample, which focused entirely on companies in the Region of Valencia. Although this highly specific focus provides contextual depth, it may limit the generalizability of the findings.

This study focused primarily on learners' perceptions of the usefulness and attractiveness of game-based learning, without directly assessing learning outcomes through objective measures. Future research could investigate how trust in game mechanics, feedback, and the overall learning environment supports and interacts with the components of the ARCS motivational framework, given that confidence and trust represent distinct constructs that influence motivation in different ways. Also, future research could expand the sample to

include a more diverse set of companies across Spain, thereby increasing the representativeness and external validity of the results.

Lastly, the study may be subject to social desirability bias, given that one of the members of the research team was also The Ecommerce Game's developer. When working as a facilitator, this member of the research team may have elicited greater participant engagement because of a strong personal connection to the game. To mitigate this potential bias, all sessions followed a standardized game implementation manual. In future research, alternative facilitation models can be explored, and the effects on participant engagement outcomes can be measured.

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Conflicts of interest

One of the authors was involved in the development of the game and acted as a session facilitator. The authors declare that this involvement did not influence the study design, data collection, analysis, or interpretation of the findings. All procedures were conducted rigorously and in accordance with academic standards to ensure impartiality and objectivity.

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