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Chapter

Social Factors Influence on Accounting Students Attitude to Use Games Based Learning

Rui Silva, Ricardo Rodrigues and Carmem Leal

Abstract

The general objective of this article is to analyze the impacts of a gamified resource created (Accountingame) as learning tools to teach the curricular unit of Accounting. Theory of Planned Behaviour was used to investigate social factors such as Social Influence, Recognition and Reciprocal Benefits, which are predictors of Attitude to use this kind of game like a learning accounting tool. The relevance of this study is due to the lack of empirical studies that analyze the application, viability, and effectiveness of gamified resources in the teaching areas of knowledge, such as Accounting. The game was used by students of Accounting (n = 816) for the first time in the scope of Higher Education in Portugal in the academic year 2018/2019. Results of this research suggest the importance of these resources to increase Attitude, Continued Use Intention and Intention to Word of Mouth related to Games Based Learning as an effective method of support for the learning process of accounting students. We believe that this study can be a contributor to researchers in this area to understand why the study of Accounting is genuinely challenging for students. This research will be enabling managers of Higher Education Institutions, professors and other educational agents to decide on the best strategies to use in order to increase student involvement in Accounting learning.

Keywords: games based learning, social factors, attitude, students, accounting, higher education

1. Introduction

Games Based Learning (GBL) utilization has been increasing in many areas, from the business world to the educational systems, and it is considered a persuasive technological method [1]. This method can generate beneficial changes in the users' attitude, nearly at the motivational level [2]. It has used in different fields of knowledge, such as marketing, medicine, sports, engineering, mathematics, computing, history, languages, physics, chemistry, biology, among others. Hence, the relevancy of this study given the lack of empirical studies on the application, feasibility, and effectiveness of gamified resources in Accounting Curricular Units. In a time when social networks and social interaction is constant, the increasing use of GBL in the teaching and learning process is a logical consequence of the evolution of technology. GBL is a social and technological phenomenon with the potential to create social benefits and foster social interaction [3]. GBL is the use of

game design elements in non-game contexts [4–6], to create motivational benefits to increase intrinsic and extrinsic motivation in users [7–9]. There are many forms of GBL activities that allow users to set and accomplish goals and tasks, earn rewards, points, classifications and feedback, or interact socially, and which recognised for their network activity [10, 11]. GBL has an extrinsic motivational effect and also strong social characteristics that need investigation [12]. Research has focused more on the results of GBL [13], and it is also necessary to obtain empirical evidence to show why people use GBL and their attitude towards this critical resource. People adopt this type of resource influenced by Word of Mouth [14] or other recommendation systems [15], and also because of social aspects [16]. User behaviour is strongly influenced by network exposure and the issue of other people's opinions, influencing their present and future behaviour [17, 18]. In this regard, the present study aims to investigate the influence of social factors on the attitude of higher education Accounting students concerning the use of this type of technological resources as a method of learning within these areas of knowledge and the ATT influence on Continued Use Intention (CUI) and Intention to Word of Mouth (IWOM) of this game to other future accounting students. The relevance of this study is due to the lack of empirical studies that analyze the application, viability, and effectiveness of gamified resources in the teaching of areas of knowledge such as Accounting. This research paper contributes to the development of the current body of literature related to the social factors that influence the attitude inherent to the use of GBL in accounting curricular units in Higher Education Institutions.

After the introduction, a longitudinal literature review follows which, over time, from the first to the most recent study about GBL applications. Section 3 describes the empirical research methodology of the article. The Results, Discussion, and Conclusions sections (Sections 4 and 5) present essential contents of the research study, as well in Section 6, we present the limitations and proposals for future research.

2. Literature review

2.1 Theory of planned behaviour

Ajzen's TPB (1991) is an extension of the Theory of Reasoned Action (TRA). It complements the TRA because it proved incapable of explaining the individuals' behaviours with full control over their actions as well as explaining how behaviour is an antecedent of intention [19]. Among many other uses, the TPB has also been used to explain, predict, and justify human behaviours related to the intention to use information and communication technologies [20]. This theory has allowed the prediction and explanation of human behaviour in several areas, including information technologies [21]. This human behaviour, which occurs when performing specific actions, is directly influenced by the intention to adopt an attitude in the execution of a specific behaviour [22]. Thus, attitude can explain how (favourably or unfavourably) an individual views the challenges that posed to them and the results that they intend to achieve, directly influencing behaviour and the way it will be the driving force for reaching specific outcomes [22]. Ajzen [22] referred in his investigations that the attitude of an individual depends on how they are predisposed, either by personal or by social influence, to acquire knowledge in a particular area of interest. This social influence is related to the subjective norm that is the social pressure exerted by friends, colleagues, family members, and others, for an individual to perform, or not, a certain behaviour. This behaviour depends

on previous experience and the obstacles faced, which can also happen in the use of technology, in general, and GBL, in particular. In several investigations related to the adoption of technology, the importance of attitude and behaviour control as intention-influencing variables has been verified [2].

The purpose of the TPB is to highlight the motivational factors that influence human behaviour, the willingness to act concerning a cause, the effort expended in that action, the willingness to perform a specific task that allows the development of favourable attitudes related to the individual's belief that that is the best way forward [23].

The TPB enables a comprehensive explanation of human behaviours related to beliefs, attitudes, norms, behavioural control, and intentions, in which behaviour, subjective norm, and perceived behavioural control influence an individual's intention. Thus, the probability of revealing a particular behaviour increases when the intentions to perform it is more substantial [24, 25]. This theory has been used in several empirical studies, evidencing an explanation of the intention and behaviour [19]. Despite the impressive prediction of behaviour, there is still a proportion of variation in it that remains difficult to explain, with enduring doubts about how all components of the TPB affect behavioural intent [22].

2.2 Games based learning and effective learning

GBL has excellent potential to motivate and teach students and enabling them to learn by playing in non-game environments [26], and aims to induce motivation in educational activities [27]. In this context, learning should not be a tedious activity, but a highly motivating and fun one [28, 29]. Several authors report that GBL has benefits for its target audience [30] because games allow users to commit mistakes and try again, experiencing learning without fear [26]. So, it is clear that GBL promotes student motivation and involvement [31], as well as their interest and progress in learning [32].

Literature-based on the efficacy of serious games, concluding that there were potential positive impacts, improving educational skills, and increasing interest in learning [33]. The relationship between digital games and learning has been investigated in several ways, essentially stating that learning is happening through the use of gamified resources [34]. This learning can be formal and informal, supporting the necessary intellectual and cognitive development [35], and making students more autonomous throughout the learning process [36]. Also, games can foster the students' critical thinking by making them more autonomous in solving problems from multiple perspectives [37]. GBL has become a popular and successful educational tool [38]. Researchers have demonstrated that it is not always practical [39]. Also, some investigations presented mixed conclusions regarding the use of GBL, with positive results in some ways and negative results in others [40]. Some authors claim the use of GBL in the classroom because it causes diverse behavioural effects. However, more research is needed to conclude how intrinsic and extrinsic motivation can be affected, as well as to discover, based on other theories, factors that may influence the use of this type of resources [41].

The effects of social factors on the utilization of gamified resources show that the number of users committed to using it increases, this being an essential requirement for the effectiveness of the resource [42].

2.3 Social factors that influence the adoption of GBL

The TPB incorporates several factors that can be tested and related to the use of technological resources inherent to GBL [22]. These social factors to Social

Influence [22], Recognition [43–47], and Reciprocal Benefits [45, 48, 49] as predictors of Attitude [22] towards using GBL and the way it influences Continued Use [49] and Intention to WOM [50].

The TPB is widely used and applied to predict behavioural intentions, measuring the attitude towards the intention of a given behaviour [22]. It is, therefore, essential to understanding how these factors can influence and persuade GBL users. So, we propose to test how SIN, RCG, and RCB directly influence ATT, just as we intend to perceive how ATT directly influences CUI and IWOM.

2.3.1 Recognition

Social feedback that users of a network or technological resource receive from the interactions among them is called social recognition [48, 51]. Recognition relates to the acceptance and approval by other members [52], reflecting the desire to achieve a positive reputation and thus leading people to become more involved in the activities [53].

When a user receives RCG, they become predisposed to recognize other users of the same service, which causes social interaction to enhanced by the reciprocal recognition promoted [54]. If the people who transmit recognition to others have relevant relationships between them, this interaction brings mutual benefits to the social community [48, 55, 56] when using a specific technological system [57]. In this regard, when a given service triggers recognition from others, ATT is positively affected [55], which means that when the experiences are positive, it is likely that the ATT towards that service is also positively influenced [58]. The search for positive recognition from others may represent a strong social, motivational effect in the learning context for the use of interactive tools [59].

As for students, they value the recognition obtained by their evolution, seeking to be acknowledged by colleagues, teachers, and family in order to be seen as experts in a particular subject and as the most intelligent in a specific area of knowledge [60]. The teachers' feedback is critical, as students feel motivated to behave in a way that increases the likelihood of teacher approval. We, therefore, hope that RCG has a positive effect on ATT towards the use of GBL. RCG is a positive experience, and the following investigation hypothesis is likely to occur. To test our final model research, we proposed the following research hypothesis H1: Recognition (RCG) has a positive influence on Attitude (ATT) towards using GBL.

2.3.2 Social influence

Based on the TRA, the TPB refers to SIN as a factor that explains individual behaviour [61]. SIN is related to the individual's perception about the social pressure exerted by others to accomplish, or not, a specific target behaviour, as well as to the importance that this person gives to the opinion that other people have about this adopted social behaviour [22, 62–64].

SIN is usually carried out by close people, such as family members, friends, co-workers, and others who have a direct effect on the person and their behavioural intention about certain phenomena [61, 65]. The importance of SIN as a predictor of ATT varies according to the specificity of the study population and group behaviour [62], which indicates that their attitudes may more influence individuals than by the perception of pressure [22, 66]. The effects of an individual's participation in social groups/networks may also explain the role of SIN in behavioural outcomes [67]. This factor has supported studies which show the acceptance of technology as a modifying element for user behaviour [68]. In this regard, there is a theoretical

basis and verified literature that demonstrates that e-learning resources can exert an essential change in the attitude towards using this type of tools. SIN can play an essential role in encouraging changes in behaviour towards learning based on technological resources [69].

SIN can be a way to encourage users, who discover that others around them attribute importance to this use, quickly perceive the benefits of it, and become more willing to use technology as a learning tool [45]. In the present investigation, the target behaviour is the use of GBL as a method that increases the learning in of management area, so we intend to understand if, in the context of GBL, SIN affects the ATT towards using the proposed gamified resource. For this, to test our final model research, we define the hypothesis of investigation H2: Social Influence (SIN) has a positive influence on Attitude (ATT) towards using GBL.

2.3.3 Reciprocal benefits

RCB can also a form of perceived social utility inherent to the use of a particular service, i.e. how this service can beneficially contribute to the social community [48]. In turn, the perceived utility is how a person believes that a given resource can increase their performance and the results of that use [43], as well as the direct effect on the intention to use and its influence through attitudes [70]. The users' ATT to perform a given activity is encouraged by the system of GBL reciprocally adopted by the social community [71]. The tendency of a particular group of people to pursue common goals leads to an increase in group cohesion. It prompts the importance given to RCB and the usefulness of this type of relationship within a given social community, stimulating their ATT to achieve specific objectives using tools of common interest [71]. Mutual recognition shared among a group of people allows the creation of a reciprocal interaction behaviour [54] that promotes the social utility of a given service, which contributes to the increase of benefits among the social community [48, 55]. We can say that receiving recognition increases the RCB of system usage [45, 48, 57]. To test our final model research, we proposed the following research hypothesis to verify if there is a positive relationship between RCB and ATT. The following investigation hypothesis has been defined H3: Reciprocal Benefits (RCB) has a positive influence on Attitude (ATT) towards using GBL.

2.3.4 Attitude, continued use intention, and intention to word-of-mouth

In the TPB, ATT is contextualized as a set of positive or negative evaluations for the realization or accomplishment of a given behaviour [22], and can be seen as a permanent and stable evaluation summary about something; it is a critical construct to predict behaviours and intentions [1]. In this regard, the greater the ATT concerning a particular behaviour, the greater the intention of a particular individual to perform it [22]. Users can assess ATT towards the use of a technological system or resource as favourable or unfavourable [22, 62]; however, there is a strong relationship between ATT and CUI [46, 72]. ATT has been identified in scientific studies as the cause of intention [73]. It can be classified into two sub-constructs: attitude towards objects and attitude towards behaviour [74]. People tend to opt for a favourable ATT when their assessment of that ATT's results is positive and when the evaluation of the resulting benefits and costs is also positive [75].

Regarding CUI, it is closely related to ATT because they depend on each other [76]. Without a positive ATT, CUI is affected, and it is possible to say that this is even more noticeable about the use of technology [22]. In the literature related to the use of technology, CUI is predicted by the perceived utility of a particular

system that directly interferes with the future intention to use it, and that allows us to reach specific objectives [43, 49]. On the other hand, the hedonic context has also been analyzed, and the pleasure of using a resource also has a relevant impact on CUI [77]. System acceptance (the pleasure and utility of use) by the user usually has a positive effect on ATT [78] which influences the CUI [77, 79] of services whose acceptance by the user is decisive [77]. The previous constructs are closely associated with promoting IWOM related to the willingness to recommend a service to others and to promote CUI [14, 80]. This IWOM usually demonstrates satisfaction with the service users and a positive ATT resulting from the fact that it has exceeded user expectations, as well as from the hope that it can exceed the expectations of others [50]. Expectations are relevant to the recommendation ATT or IWOM, with a substantial impact on the intentions of current and future users [81]. IWOM has a significant impact on behaviour, promoting an ATT of service counselling in satisfied users, either through word-of-mouth or digital means [82]. This desire to promote an appeal through IWOM is entirely independent of interests because it is carried out by users who are external to the service. People who have no economic interest in it and who, due to their unbiased opinion, recommend it without the intention of altering the truth about the real value of it [83]. User reviews can be positive or negative, significantly affecting the future behaviour of the users themselves and those who receive feedback via IWOM [84]. In fact, IWOM is recognised as being able to play a role in influencing social behaviours [85], resulting in positive ATT (IWOM positive) or negative ATT that can directly or indirectly change the behaviours and intentions to continue using a particular service in the future [86]. Several studies have reported the importance of WOM behaviours as a factor that can significantly impact behaviour and intention to use and recommend a resource, product, or service [86, 87]. IWOM influences friends, colleagues, family members and others in order to increase utilisation because it exerts an influencing effect on ATT and significant adoption behaviour as well as increases the users' loyalty towards future use [88]. Based on the exposed literature, to test our final model research, we suggest the following hypothesis of investigation H4: Attitude (ATT) has a positive influence on Continued Use Intention (CUI) to use GBL and hypotheses of investigation H5: Attitude (ATT) has a positive influence on Intent Word-of-Mouth (IWOM) about the use of GBL.

3. Empirical research

This research is the result of using AccountinGame that has been specially designed to serve as educational tools for teaching Accounting. The aim here is to prove that not only teachers may use this tool to complement their classes, but also students may benefit from it outside lesson hours, both as a study aid for the various subjects and a way to test their knowledge. This game was applied to first-year Accounting Portuguese undergraduates' students in 2018/2019 school year.

AccountinGame consists of a quiz containing questions about the syllabus of Accounting curricular units. It should be pointed out that the game contents were designed according to the programs in place in Portuguese Higher Education Institutions and that the ones that were chosen were shared by all the Higher Education Institutions that participated in the study. In order to be able to use this resource, students were expected to register themselves in the respective platforms and fill in their sociodemographic data, after which they could play the game either individually and networking.

Accountingame were developed to make Accounting classes more appealing and motivating and to facilitate student learning. The game consists of a board

divided into eight squares; each square contains a set of 200 questions the player must answer. Questions appear randomly and refer to Accounting. To continue playing, the player must give correct answers. During the game, players can learn several subject matters that have to do with the various topics addressed. The game begins at the centre of the board. Each player is placed randomly in one of the squares numbered from 1 to 8. The first player to play is the one placed in square n° one and so on, in ascending order. To move forward, the players must give correct and suitable answers to the questions they are asked, depending on the square they are in at the moment. Questions refer to the contents of the squares the players are in and are previously defined in the game rules. The aim of the game is that the first player answers correctly to at least one question of each topic of the prominent corners of the board and three questions of each topic of the remaining squares. For each correct answer, a star is lit. When all stars are lit, the player can, then, move to the centre of the board. The first player to light all the stars and get to the centre of the board by giving a correct answer to a question is the winner of the game.

This game must be preferably played by eight players or by groups of 2 players, totalling a maximum of 16 students per game. The game can be played by fewer students or even individually, in any case. Nevertheless, the main aim is that each time eight players play the game so that they can individually test their knowledge and learn from the errors and victories, theirs, and their opponents'. Starting from the centre of the board, the first player to play will have to correctly answer a question from the topic belonging to the square he/she is inside. If the answer is right, he/she can move forward to the square corresponding to the number on the dice and according to his/her game strategy; if the answer is wrong, he/she will remain in the same square. Each player has 90 seconds to answer the questions, after which time if this answer if not answered, it is considered wrong.

Whether the player gives a right or a wrong answer, it is always another player's turn to play and so on. When the player gets to the square-shaped part on the outside of the game, he/she can choose any direction according to his/her game strategy and the topics he/she wishes to handle first. Always bearing in mind that he/she will have to remain in that area of the board until all questions were answered and the answers are correct. Only when all stars are lit can the player move toward the centre. Players must plan their moves carefully, trying to choose the squares where it is more convenient for them to answer the questions. Once the players move in each direction, there is no going back. For instance, if the player throws the dice and number 5 comes up, he/she cannot move three squares to the right and 2 to the left. Each move must consider the most convenient direction, targeting a specific topic, regarding which no star has yet been lit. If the numbers on the dice do not allow the players to move to a topic to which they have not yet answered, they score points for giving a correct answer to a question regarding the square they are inside. More than one player can occupy the same square on the board (**Figure 1**).

During the game, players may check the game rules so that they know what is expected of them and have permanent feedback on their progress and results [89]. Additionally, they can check their score and position in the general ranking at all times, and, therefore, compare their performance with that of their opponents' [90]. Thus, the players' state of flow, interest, and understanding of the concepts is ensured [91]. Games are also an opportunity to develop social interaction, cooperation, a healthy competition, and a high focus on learning [89, 90].

The game has a general ranking which shows which students have higher scores resulting from the correct answers given while playing the game. This score accumulates from game to game and is national-wide. The students have immediate feedback on their score and performance throughout the game, and it is always
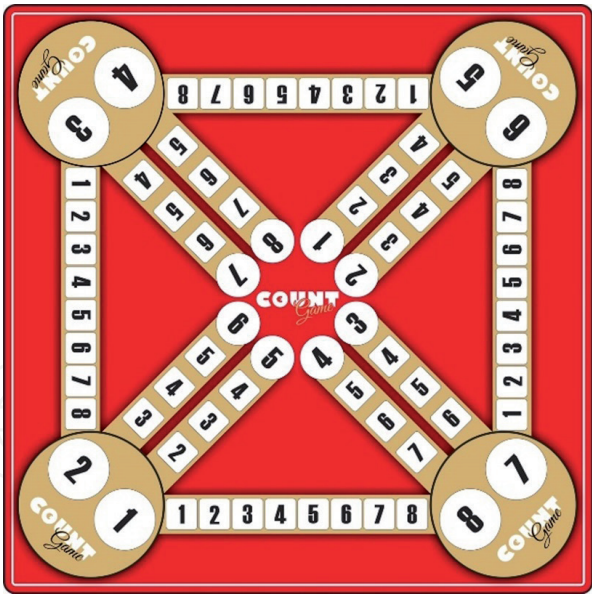
Figure 1.
Accountingame online board.

possible to visualize the correct answer, even when the student does not get it right. Such information is also available as regards other students who are playing the same game [92]. The possibility of playing as a group, creating a profile, and having access to the answers of other users allows for an interaction similar to that of a social network [76, 93].

Introducing this game in an educational context within Accounting in Higher Education Institutions helps students in their quest for knowledge, awakening their interest for new learning experiences through new and stimulating pedagogical situations [94, 95]. Thus, learning through playful activities acquires a more definite meaning, accompanying the student/player throughout his/her academic life, since the knowledge that obtained is comprehended and, when necessary, interactively expressed.

3.1 Participants

Participants were students, aged between 17 and 43 (the average age was 19,96), of which 39% were male and 61% female. A total of 860 questionnaires were gathered, in the paper during the classes, from a total population of 3083 Accounting students; 44 questionnaires were excluded for not being duly filled in (containing unanswered questions or more than one option for just one statement). 17 out of 20 Higher Education Institutions participated in this study, which corresponds to 85% of all Portuguese Higher Education Institutions (**Table 1**).

In **Table 1**, the column of the gamified group corresponds to the group of students who used the game as a Learning method. In the same table we can see with signal "--"the Higher Education Institutions, belonging to the Portuguese public education system, that did not accept to participate in this study, are also presented.

In total, 816 valid questionnaires were obtained among Accounting students, which makes for a final sample in a universe of 3083 students that were enrolled in this curricular unit for the first time. The total response rate was 26.5%.

Over the first six weeks of the semester, students registered themselves in the game, not having access to its content and attending regular classes with the teachers. From the seventh week onwards, the content of the game was made available so that teachers were able to use them in class as a complement to teaching their respective subjects.

Higher education institutions	Population	M	F	Gamified Group
Polytechnic Institute of Guarda	40	11	29	28
Polytechnic Institute of Bragança	84	35	40	48
Polytechnic Institute of Coimbra	20	—	—	—
Polytechnic Institute of Leiria	110	—	—	—
Polytechnic Institute of Lisboa	195	49	85	0
Polytechnic Institute of Portalegre	67	9	8	17
Polytechnic Institute of Viana do Castelo	90	35	23	38
ISCTE - University Institute of Lisbon	280	61	52	54
University of Beira Interior	102	45	53	0
University of Madeira	75	28	42	50
University of Aveiro	88	48	31	31
Coimbra School of Economics	243	38	43	0
University of Évora	101	32	59	65
Lisbon School of Economics and Management	380	95	149	156
University of Trás-os-Montes e Alto Douro	74	29	45	60
University of Algarve	165	20	49	64
University of Minho	152	43	91	80
Porto School of Economics	345	71	116	105
Azores School of Economics and Management	52	22	30	20
Lisbon New School of Economics	420	—	—	—
Total	**3083**	**671**	**945**	**816**

Table 1.
Sample characterization – Accounting students.

Students could autonomously use the game whenever they wished as a means to test what they had learned in class. This was monitored over the semester to gather information on such aspects as to how long each student played the game; the subjects that were studied; how often they had completed the game; how many questions had been answered; the number of correct and wrong answers.

The average game usage in the classroom was three to two-hour sessions per student, a figure that was higher when one considers the number of students (87,13%) who played the game, in a total of 816, outside the classroom, due to their having the possibility of accessing this resource autonomously outside class hours. This percentage of 87,13% corresponds to 711 students, in a total sample of 816, who played the game three to two-hour sessions as an Accounting Learning method. To obtain this percentage, we dived the total sample (816) by the number of game users (711). These were the players who played three to two-hour sessions.

At the end of the semester, before the final evaluation, students were asked to answer a questionnaire, assessing the importance and contribution of the game to their learning.

3.2 Measurement instruments

To collect data, we used a survey by questionnaire, collected both online and in-person, using validated literature scales. This questionnaire uses dimensions

such as RCB, SIN, RCG, ATT, CUI, and IWOM that the user of an e-learning game experiences when operating it as a learning tool. All questionnaire items resulted from adapting previously validated scales used in other relevant scientific studies (**Table 2**). The attitude was measured using a combination of scales by several authors (Appendix 1). We translated and adapted these scales to the Portuguese language. The adaptation of scales did not involve many changes and enabling the application of the same scale. All the items were measured using a 7 point-Likert scale, varying between "Does not fully correspond" and "Fully Corresponds". The questionnaire was administered at the end of the semester, before the final evaluation, to all students who had played the game for at least six hours. It should be noted that the average game utilization rate in class was three sessions of two hours each; nevertheless, the total rate of the students' individual use was over 87,2%, since they were allowed to play it outside school hours.

3.3 Research model

According to the literature review described in Section 2.3, we present in **Figure 2** the research model to test during this investigation.

3.4 Validity and reliability

The theoretical model presented here was estimated by using the SPSS/AMOS 24 structural equation modelling program [99]. The measurement model (validity and

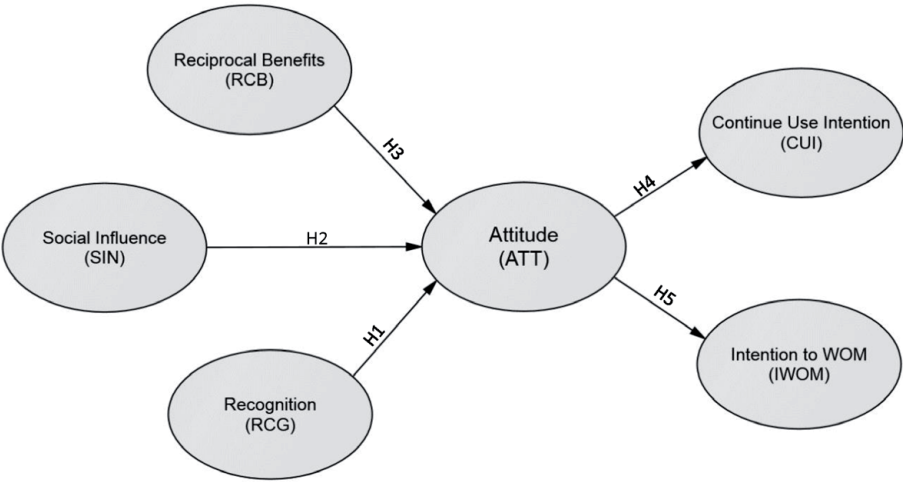| Constructs	Authors
Social Influence (SIN)	[22, 45, 96, 97]
Recognition (RCG)	[44, 46, 92, 98]
Reciprocal Benefits (RCB)	[43, 47, 49]
Attitude (ATT)	[22]
Continued Use Intention (CUI)	[49]
Intention to Word-of-Mouth (IWOM)	[50]

Table 2.
Measurement instruments.

Figure 2.
Research model.

	CR	AVE	α	IWOM	SIN	RCG	CUI	ATR	RCB
IWOM	0.843	0.641	0.833	**0,800**					
SIN	0.909	0.769	0.909	0.750	**0.877**				
RCG	0.882	0.718	0.867	0.418	0.662	**0.847**			
CUI	0.738	0.526	0.891	0.436	0.525	0.402	**0.725**		
ATT	0.906	0.763	0.902	0.634	0.544	0.519	0.615	**0.873**	
RCB	0.857	0.667	0.842	0.793	0.651	0.553	0.687	0.735	**0.817**

IWOM = Intention to Word-of-Mouth, SIN=Social Influence, RCG = Recognition, CUI=Continued Use Intention, ATT = Attitude, RCB = Reciprocal Benefits.
Note 1: Diagonal represents the square root of the AVE.
Note 2: Outside the diagonal, we can observe the correlation between the constructs.

Table 3.
Convergent and discriminant validity.

reliability of the measures) was analyzed according to the literature, and several research hypotheses were tested to assess the meaning of the loads and coefficients of each path [100]. To evaluate convergent validity and reliability of the model, the Average Variance Extracted (AVE), the Composite Reliability (CR), and the Cronbach's Alpha (α) were analyzed, using only measurement items whose factor loads (AVE > 0,5; CR > 0,7; α > 0,7) were well within acceptable statistical parameters [100].

Table 3 presents the different dimensions of the study that are related and whose correlation between the different constructs is strong. The dimensions IWOM, SIN, RCG, CUI, ATT, and RCB present significant correlations that demonstrate the ability that the different constructs must explain the results of the study. The closer to 1, the greater the ability to explain the influence of each construct in explaining the reality that is being studied. On the other hand, we found that the AVE values for each of the latent constructs are more significant than the highest square correlation with any other latent variable. Therefore, discriminant validity is established at the construct level.

The results presented in **Table 3** have sufficient convergent and discriminant validity to validate the results presented in which the Attitude to learn accounting using gamified resources is influenced by social factors.

4. Results

The theoretical model presented here was estimated by using the SPSS/AMOS 26 structural equation modelling program [99]. The measurement model (validity and reliability of the measures) was analyzed according to the literature, and several research hypotheses were tested to assess the meaning of the loads and coefficients of each path [100]. To evaluate the model's convergent validity and reliability, the Average Variance Extracted (AVE), the Composite Reliability (CR), and the Cronbach's Alpha (α) were analyzed, using only measurement items whose factor loads (AVE > 0,5; CR > 0,7; α > 0,7) were well within acceptable statistical parameters [100]. In what concerns the measures that were used in this study, they are sufficiently valid and reliable (**Table 2**), and the sample that was obtained meets the criteria of structural equation analysis [101].

The research model tested (**Figure 3**) allowed us to verify that 67,6% of the ATT towards using GBL as a learning tool to teach management is explained by the RCB,
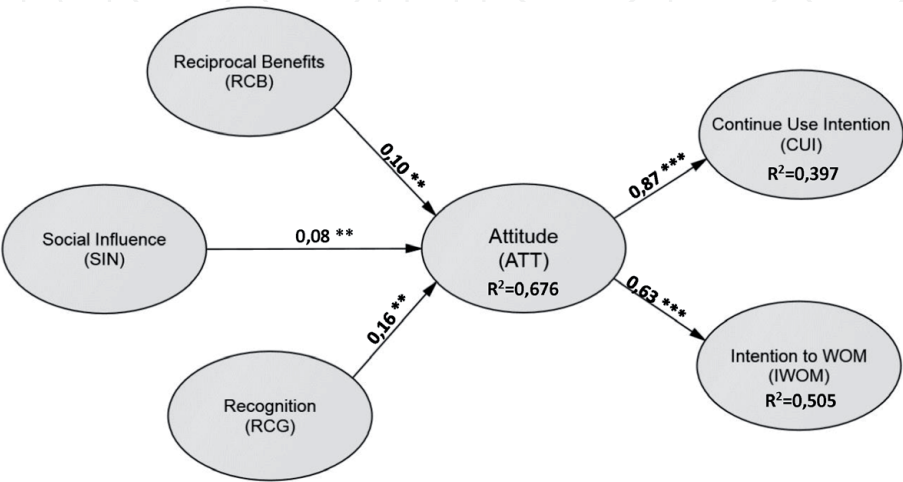
Figure 3.
*Structural model results. ** p<0.05; *** p<0.001.*

Hypotheses	Effect	Regression Coefficient	Standard Error	t	p-value	Results
H1	RCB → ATT	.100	.100	.813	<0.05	Supported
H2	SIN → ATT	.081	.106	.944	<0.05	Supported
H3	RCG → ATT	.161	.221	4.802	<0.001	Supported
H4	ATT → CUI	.874	.112	5.669	<0.001	Supported
H5	ATT → IWOM	.638	.122	7.163	<0.001	Supported

Table 4.
Research hypotheses and statistical results.

SIN, and RCG dimensions. The model also explains 39,7% of the CUI and 50,5% of the IWOM. The direct paths tested were all statistically significant. We verified the effect of the RCB, SIN, and RCG dimensions on CUI and IWOM dimensions mediated by the ATT dimension.

In **Table 4**, we can see the structural results of the RCB, SIN, and RCG dimensions, which have direct and positive statistical significance on ATT, validating the formulated hypotheses (H1, H2, and H3). The ATT dimension has a positive, statistically significant, direct influence on CUI and IWOM, validating the hypotheses (H4 and H5).

The estimated results of the research model indicated that Reciprocal Benefits, Social Influence, and Recognition Attitude, after using AccountinGame have a positive effect on Attitude. In the other side, Attitude has a positive effect in Continue Use Intention and Intention of Word of Mouth to use and advise the game like a learning tool. In its turn, the Attitude to study and learn after using the game also influenced the students. All relationship between dimensions was statistically significant, meaning that the fact that students are immersed with the use of the game to improve learning. Looking to the final results, we can start by saying: RCB has a positive impact on ATT($\beta = 0.10$, $p < 0.05$); SIN has a positive impact on ATT($\beta = 0.081$, $p < 0.05$) and RCG has a positive impact on ATT($\beta = 0.161$, $p < 0.001$); Results confirmed and validated research hypotheses H1, H2 and H3. In the other side, ATT has a positive and statistically significant direct strong influence on CUI ($\beta = 0.874$, $p < 0.001$) and in IWOM($\beta = 0.638$, $p < 0.001$) validating H4 and H5 od the research proposed model.

In what concerns ATT-mediated effects, some mediated relationships producing statistically significant total effects were observed, such as: RCB → ATT → CUI ($\beta = 0.10*0.874 = 0.087$, $p < 0.001$); RCB → ATT → IWOM ($\beta = 0.10*0.638 = 0.063$, $p < 0.001$). Talking about indirect effect of SIN in CUI and IWOM results showed that SIN → ATT → CUI ($\beta = 0.081*0.874 = 0.070$, $p < 0.001$); SIN → ATT → IWOM ($\beta = 0.081*0.638 = 0.051$, $p < 0,001$). Finally we analysed indirect effect of RCG in CUI and IWOM of Accountigame users and we concluded that RCG → ATT → CUI ($\beta = 0.161*0.874 = 0.140$, $p < 0.001$); RCG → ATT → IWOM ($\beta = 0.161*0.638 = 0.102$, $p < 0.001$).

5. Discussion and conclusions

In this article, we investigated how social factors influence the attitude of higher education students of Accounting towards using technological gamified resources as a learning method within these areas of knowledge. Using the theoretical background provided by the TBP [22], we tested how social factors like RCB [45];

C.-P. [48], SIN [22, 45, 61, 62, 97] and RCG [44, 45, 49] were predictors of ATT [61] towards using GBL and the influence of ATT in CUI [49] and IWOM [50].

We tried to understand how each factor influences HE students to increase the attitude towards using GBL as a complementary learning tool in one of the area of Management (Accounting) and if this construction of a positive attitude towards usage influences future intention to use and intention to recommend the tool to others. We tested if the students' behaviour after using GBL lead to the desire to continue using technology as a standard study tool. The results obtained indicate that the amount of recognition that users receive from others when using the resource directly and significantly affects the attitude towards GBL [57, 59]. Regarding the way other people (colleagues, family, friends) socially influence the use of this type of tools, we have verified that there is a statistically significant cause and effect relationship that corroborates previous research [22, 66, 69]. Concerning the benefits or usefulness resulting from using this type of technological resource, users are satisfied when the services are useful for learning, easy to use, and practical, previous corroborating research [45, 54, 57, 71]. The results also indicate that the ATT towards GBL service is a strong determinant of the CUI related to the future frequent use of the resource [47, 72, 76, 102], and IWOM, which is related to the intentions of recommending and saying positive things about the service used [50, 84, 103].

Previous studies have already tested the influence of social factors on ATT [42], as well as the influence of ATT on CUI and IWOM [104]; however, in this investigation, we used the TPB as the basic theory to test the influence of more social factors, simultaneously, on ATT and CUI and IWOM, based on the use of resources for the teaching of the area of knowledge management. Therefore, we seek to increase theoretical knowledge on this subject and to contribute to a better understanding of the influence of social factors on the continued use of the technology. After a minimum of six hours of use per student, the game used in this empirical study (Accountingame) allowed to test if the already mentioned social factors had direct effects on the attitude and if this dimension had a positive relation with the intention to continue using and recommending the service designed to support the teaching of Accounting in the context of Portuguese higher education.

The findings resulting from this research fill the gap in the literature regarding the effects of GBL in Accounting students, demonstrating that these areas of knowledge, like many others, can support the use of resources intended for this purpose.

The results of the present study, along with the findings previously achieved by other authors referenced in this study, indicate that the use of GBL has positive effects on attitude to learning, through intervention and because of several dominant social factors. In this regard, the validated hypotheses indicate that it is necessary to continue supporting the use of gamified technologies as a complementary teaching method for the acquisition of knowledge.

6. Limitations and future research

Future studies may investigate how social factors interfere with the attitudes of students towards using GBL, among other distinct areas of knowledge, noting that the results in these areas will be close to those obtained in the present investigation.

A study to compare the influence of social factors on the attitude towards GBL of students from different countries, in similar study fields, could also be carried out. An attempt to understand how social factors have more impact according to sociodemographic data variables such as gender, age, nationality, academic background, and

even family background could be carried out as well. Regarding family background, it would be useful to compare how Accounting students view GBL as a method of learning according to their family history, directly or indirectly related to these areas of knowledge. Future qualitative studies would be interesting to study the phenomenon from another perspective in the attempt to obtain other data resulting from an investigation, and this different methodology might bring other conclusions and other theoretical contributions.

Regarding the limitations of the investigation, we denote the fact that the data are self-reported and can influence the results because users, when interested in a service, can become emotionally involved in the activities, which affects their reasonable opinion about the utilized resource.

Regarding the collection instruments, although empirically and scientifically validated, they can be replaced by other relevant ones like structured or semi-structured interviews. Scales are always liable to questioning and replacement by others that may eventually have more statistically robust results.

The methodology of quantitative research itself and its generalization be limiting insofar as there are no two matching realities even when studying the same phenomenon.

Appendix 1

Question	Constructs	Authors
Using the game was important	Attitude	[22]
Using the game was a good idea		
Using the game was positive		
I anticipate keeping using the game in the future	Continue Use Intention	[49]
I intend to use the game frequently, as I have done so far		
I anticipate using the game more frequently than less frequently		
I feel good when my achievements in the game are acknowledged	Recognition	[44, 46, 92, 98]
I enjoy it when my colleagues understand my evolution throughout the game		
It is good to notice that other users follow my activities in the game		
The people who influence my attitudes would recommend using this game	Social Influence	[22, 45, 96, 97]
The people who I like would encourage me to use the game		
My friend's thing it is a good idea to use the game		
I will recommend the game to my friends	Intention WOM	[50]
I will recommend the game to people who ask my opinion about its usefulness		
I will say positive things about the game so that other people will use it		
I think the game is quite useful to learn	Reciprocal Benefits	[43, 47, 49]
It is easier to start studying by using the game		
Using the game, I feel that I am learning in a more effective manner		

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