Serious games and learning effectiveness: The case of *It's a Deal!*

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ABSTRACT

Although the value of serious games in education is undeniable and the potential benefits of using video games as ideal companions to classroom instruction is unquestionable, there is still little consensus on the game features supporting learning effectiveness, the process by which games engage learners, and the types of learning outcomes that can be achieved through game play. Our aim in this discussion is precisely to advance in this direction by providing evidence of some of the factors influencing the learning effectiveness of a serious game called *It's a Deal!* This serious game was created for the purpose of teaching intercultural business communication between Spaniards and Britons in business settings in which English is used as the *lingua franca*. This paper hypothesizes that the immersive, all-embracing and interactive learning environment provided by the video game to its users may contribute to develop and enhance their intercultural communicative competence. The study attempts to answer three main research questions: (a) after playing *It's a Deal!*, did the students sampled improve their intercultural awareness, intercultural knowledge and intercultural communicative competence in business English? (b) If they improved their intercultural learning, what are the factors influencing such improvement? And (c) if they did not improve their intercultural learning, what are the factors influencing such failure? The game participants who volunteered to take part in the study were all students of English Studies at the University of Alicante in the academic year 2010–2011. One hundred and six students completed both the pre-test and the post-test questionnaires, and played *It's a Deal!* A sample of fifty students was selected randomly for the empirical study. The results obtained in the tests performed were compared and contrasted intra-group, both qualitatively and quantitatively, for the purpose of finding any statistically significant difference that may confirm whether or not there was an improvement in the students' intercultural communicative competence in business English as a result of the implementation of the *It's a Deal!* serious game. Findings of this study demonstrate that the video game is an effective learning tool for the teaching of intercultural communication between Spaniards and Britons in business settings in which English is used as the *lingua franca*. In particular, whereas the game had a small learning effect on intercultural awareness and a medium learning effect on intercultural knowledge, it had a large learning effect on intercultural communicative competence. The study also documents correlating factors that make serious games effective, since it shows that the learning effectiveness of *It's a Deal!* stems from the correct balance of the different dimensions involved in the creation of serious games, specifically instructional content, game dimensions, game cycle, debriefing, perceived educational value, transfer of learnt skills and intrinsic motivation.

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1. Introduction

Over the last few years, serious games[1] integrating simulated experience have increasingly attracted the attention of professional trainers and educators. "While there is clearly a need for baseline research into how games and simulations are currently being used in the home and for learning", argue de Freitas & Oliver (2006: 250), "general trends in the research indicate the increasing popularity amongst learners for using serious games and simulations to support curricula objectives." It is not surprising that computer games are being incorporated more and more into learning environments, e.g. classroom education, government, financial services, healthcare, hospitality and catering, science and technology, telecommunications, corporate and military training, etc. Garris, Ahlers & Driskell (2002: 441–442) referred to the three major factors that may have contributed to the rapid growth of serious games in professional training and educational contexts. The first factor is the emergence of a new paradigm in the field of teaching and learning. This has brought three significant changes: (a) the shift from a teacher-centred approach to a learner-centred approach, (b) the shift from a model of instruction based on listening to a model of instruction based on doing and interaction, and (c) the shift from a concept of learning based on memory to a concept of learning based on the capacity to find and use information. The second factor is the development of new interactive technologies that provide an opportunity to actively involve students in problem solving. The third factor is the tremendous capacity of serious video games to capture the students' attention and engage them in the curricular content. In a more recent piece of research, Wrzesien and Alcañiz Raya (2010: 179) also refer to the powerful and effective learning environment provided by serious video games. Drawing on the literature of serious games over the last decade, they particularly emphasize three main reasons for the ever-increasing use of serious games in education: (a) they use actions rather than explanations and create personal motivation and satisfaction, (b) they accommodate multiple learning styles and abilities, and (c) they foster decision-making and problem-solving activities in a virtual setting. Some of the potential advantages of using serious games in professional and educational contexts have also been examined by Mayo (2007: 32–34). These are: (a) massive reach, (b) experiential learning, (c) enquiry-based learning, (d) self-efficacy, (e) goal setting, (f) cooperation, (g) continuous feedback, (h) enhanced brain chemistry, (i) time on task, etc.

1.1. Statement of the problem

At present the value of serious games in education is undeniable (Rieber, Smith, & Noah, 1998: 29–37) and the potential benefits of using video games as ideal companions to classroom instruction is unquestionable (Chen & Michael, 2005; Corti 2006: 1–20). However, we must admit that there is still little consensus on the game features supporting learning effectiveness, the process by which games engage learners, and the types of learning outcomes that can be achieved through game play (Garris et al., 2002: 442; Nash, 2005: 227). We agree with Wong et al. (2007: 49) when they claim that "A common denominator for advancing the research and development of educational tools like computer games is to leverage from play and entertainment by documenting correlating factors that make serious games effective."

1.2. Purpose of the study

Our aim in this discussion is precisely to advance in this direction by providing evidence of some of the factors influencing the learning effectiveness of a serious game called *It's a Deal!* (Guillén-Nieto et al., 2011). This video game was created for the purpose of developing the intercultural communicative competence of students of business English (Guillén-Nieto, 2009b: 539–552; Guillén-Nieto & García-Yeste, 2009: 259–260; Guillén-Nieto & Pernías-Peco, 2009: 6966–6974). Before we move on to present our study on the implementation of the serious game *It's a Deal!*, we will review some of the most outstanding contributions that have recently been made in relation to the learning effectiveness of serious games.

2. State of the art

The potential of serious games to enhance the effectiveness of training and learning has been a subject of debate in much of the literature published in the field of learning over recent years. Although many studies have demonstrated that serious games make the learning of curriculum content engaging and stimulating, their effectiveness as learning tools is still to be demonstrated. No definite answer has yet been given to research questions such as: Are serious games effective means of educational training? Are they effective above and beyond current methods? And which serious game features influence learning effectiveness? In this respect, most researchers seem to agree that there is a lack of empirical evidence obtained using a rigorous methodological approach (Coller & Scott, 2009: 900–912; Wrzesien & Alcañiz Raya, 2010: 179). In what follows, we will be referring to a selection of relevant contributions to the state of the art. This will be divided into two sections: (a) business simulation games and (b) serious games and learning effectiveness evaluation models.

2.1. Business simulation games

The videogame *It's a Deal!* could be categorized as a serious game (Backlund, Engström, Johannesson, & Lebram, 2010: 147; Dempsay, Haynes, Lucassen, & Casey, 2002: 58; de Freitas, 2006: 10) belonging to the sub-type of business simulation games, in so far as it recreates business situations in which the players have to deal with decision-making and problem-solving tasks that will enable them to acquire the intercultural business communication competence, which is the learning outcome of the game. Business simulation games, which were created formerly by military officers who used war games to learn tactics and strategies in the 1930s and 1940s (Faria, 1987: 207–208), have

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[1] According to de Freitas (2006: 10), serious games are "…applications using the characteristics of video and computer games to create engaging and immersive learning experiences for delivering specified learning goals, outcomes and experiences." As a result of the Serious Games Initiative, which started in 2002 at the Woodrow Wilson Centre for International Scholars in Washington D.C., the term serious games became visible (Wong et al., 2007: 50). In the literature serious games are also referred to as educational games, computer games, video games, game-based learning, and instructional games.

a fruitful history in the teaching of business and management, and in providing learners with the necessary training to improve their communicative competence skills (García-Carbonell & Watts, 2009: 285–316). The TOP MANAGEMENT DECISION GAME, designed by Schreiber and used at the University of Washington in 1957 (Faria, Hutchinson, Wellington, & Gold, 2009: 465), is thought to be the first game to be used for teaching purposes at a university. Since then the use of business games for teaching purposes has become a widespread teaching methodology. In a recent empirical study carried out to ascertain the effectiveness of simulation and gaming methodology in the learning of English as a foreign language for specific purposes, Rising (2009: 317–353) reached the main conclusion that the use of simulation and gaming methodology in the English for specific purposes classroom facilitates effective and appropriate communication. "Business games/simulations", said Rising in the concluding remarks of her study, "can not only give more 'real' practice in business vocabulary (…) but also improve negotiation skills, writing skills, etc." (Rising, 2009: 337).

Since the 1970s, business simulation games involving intercultural encounters have also multiplied worldwide. They draw on the main idea that each culture is governed by a set of particular principles or rules. Players are made to play a game in which the set of rules is different, but the players are not aware of this difference. The general purpose of this type of simulation games is to make players reflect upon their inaccuracies and miscalculations and learn what they can do to prevent similar communication problems in the future. Some illustrative examples of business simulation games on the market incorporating realistic national cultural characteristics in role profiles are the following: *After NAFTA; A cross-cultural negotiation exercise* (Butler, 1996: 507–516); *BaFá BaFá* (Bredemeir, Berstein, & Oxman, 1982; Shirts, 1977); *Barnga* (Thiagarajan & Thiagarajan, 2006); *Ecotonos: A multicultural problem-solving simulation* (Nipporica Associates & Hofner Saphiere, 1997); *Randömia balloon factory: A unique simulation for working across the cultural divide* (Grove & Hallowell, 2001); as well as *The trade mission* and *Follow-the-sun global technology team*, two full simulations in which Hofstede, Pedersen and Hofstede in *Exploring culture* (2002) provide a didactic application of Hofstede's (2001) five value dimensions of national culture—the "synthetic culture approach."

Despite all that has been mentioned above regarding business simulation games involving intercultural encounters, we would like to point out that very few serious video games focus on business communication strategies; in fact, most of them were designed for the purpose of training players in specific professional abilities and are mainly focused on knowledge or skill instruction (Raphael, Bachen, Lynn, Baldwin-Philippi, & Mckee, 2010: 223). Among the serious video games encompassing business communication strategies, we may quote WeBLOG (Kuriger, Wan, Mirehei, Tamma, & Chen, 2010). This serious video game follows the line started by games such as the *LEAN ZONE OFFICE* (Visionary Products, n.d.), the *LEAN BUSINESS SIMULATION GAME* (Aster Training), or *The MAINLAND SIMULATION GAME* (NESTADT Consulting); nevertheless, neither of these games is centred on intercultural skills learning (Kuriger et al., 2010). The lack of intercultural communication training can be observed in other commercial business simulation games such as the *Capitalism*™, *Harvest Moon*™ or *Tycoon*™ series, as well as in professional training video games such as *Levee Patroller* (Harteveld, Guimarães, Mayer, & Bidarra, 2010) and traffic simulators. Specifically, Backlund et al. (2010: 166) hint that the negative outcomes of videogame playing, such as the players tending to break more traffic rules, could be avoided if games would support the learning of social and intercultural skills.

As shown in recent studies (Marfisi-Schottman, George, & Tarpin-Bernard, 2010; Neys & Jansz, 2010; Raphael et al., 2010), there is undoubtedly an outgrowing interest in the creation of serious games for the purpose of developing intercultural learning skills, because it is assumed that video games offer the expressive, multifaceted and complex variables that the intercultural and social competencies need to be adequately learnt (Neys & Jansz, 2010: 238; Raphael et al., 2010: 224).

2.2. Serious games and learning effectiveness evaluation models

Over the last few years there have been some attempts to bring in learning effectiveness evaluation models. For example, Garris et al. (2002: 441–467) presented a far-reaching input-process-output model of instructional games and learning that has implications for the design and implementation of effective instructional games. Their approach centred on: (a) the game dimensions that are of interest from an instructional perspective (fantasy, rules and goals, sensory stimuli, challenge, mystery and control); (b) the game cycle of user judgements (interest, enjoyment, task involvement and confidence); (c) user behaviour (sustained involvement, effort, concentration, and persistent reengagement); (d) system feedback and debriefing; and (e) the types of learning outcomes that can be achieved (skill-based learning outcomes, cognitive learning outcomes and affective learning outcomes). de Freitas & Oliver (2006: 249–264) introduced an integrative four-dimensional framework for evaluating games-and-simulation-based education and emphasized the role of debriefing as critical for effective learning with games and simulations. The first dimension in de Freitas and Oliver's framework focuses upon the particular context where play/learning takes place. The second dimension gives attention to the learner profile. The third dimension examines the internal representational world, namely the mode of presentation, the interactivity, and the levels of immersion and fidelity used in the game or simulation. And the fourth dimension concentrates on the processes of learning, namely the learning models used, e.g. experiential learning and constructionist theories. de Freitas & Jarvis (2007: 523–525), both members of the research team developing the Serious Games—Engaging Training Solutions (SG-ETS) project,[2] aimed at describing a comprehensive framework and development process that together would help to ensure that the specified serious game did in fact satisfy the needs of the target learner group. Some of the key research questions posed in this project were: (a) What are the instructional design principles for effective learning with serious games? (b) What types of learning objectives are best satisfied with games? And what is the most effective strategy for assessment and evaluation that will ensure that the learning objectives are achieved through use of the game and other supporting learning? (de Freitas & Jarvis, 2007: 525). Greitzer, Kuchar & Huston (2007: 1–16), on their part, explored the cognitive principles leading to active learning instructional design guidelines that can be applied to improve the training effectiveness of serious games, to be precise (a) stimulate semantic knowledge, (b) manage the learner's cognitive load, (c) immerse the learner in problem-solving activities, (d) emphasize interactive experiences, and (e) engage the learner. And last but not least, Yusoff, Crowder & Gilbert (2010: 45–51) set up a conceptual model for the design of serious games using the Technology Acceptance Model (TAM) for its validation. Their research focused on the *Unilink Bus* serious game, a specially developed game

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[2] The Serious Games—Engaging Training Solutions (SG-ETS) project is one of the first to bring game developers and pedagogic expertise together from three leading research universities in the UK, computer game development companies and leading learning companies.

for introducing international students to public transport in Southampton. After completing the game, participants filled in a short questionnaire and the data were analyzed using Structural Equation Modelling (SEM). The results identified the attributes and combinations of attributes that led the learner to accept and use the serious game for learning. According to the authors, "(…) the combination of transfer of learnt skills to usefulness, situated learning to ease of use, learner control to usefulness, ease of use to usefulness, and usefulness to behavioural intention to use provide an indication of how to design successful and effective serious games that would ensure learners use them for learning." (Yusoff et al., 2010: 50).

In parallel with the creation of learning effectiveness evaluation models, an increasing amount of applied research is done on evaluating the learning effectiveness of specific educational games on the market to help tutors choose and apply suitable serious games to their learning context. To illustrate this line of research, let us consider the findings of some current studies:

Mayo (2007: 34) reported the findings of two studies investigating the learning effectiveness of three serious games. The first examined *Geography Explorer* and *Virtual Cell* in 2001 and showed the games increased learning outcomes by 15%–40% (*Geography Explorer*) and 30%–63% (*Virtual Cell*) when compared to the learning outcomes obtained by the students in the control groups who learnt through interactive lectures. The second analyzed an algebra game called *Dimenxian* in 2005 and demonstrated that the 75 students playing *Dimenxian* increased their algebra knowledge by one grade level (such as from B to A). Wong et al. (2007: 49–55) gave an account of their evaluation of the interactivity and media richness aspects of *Metalloman*, a serious game to teach physiology concepts, compared to hypertext and text-based instruction. Their findings did not confirm the hypothesis that interactivity is a crucial factor in media-based learning, since comparable knowledge gains in all enriched media formats (game, replay and hypertext) were observed.

On assessing the learning effectiveness of a video game-based engineering course, Coller & Scott (2009: 900–912) proved that students taking *NIU-Torcs*, a game-based numerical methods course, were more engaged in their course work and demonstrated deeper learning in a concept mapping exercise compared to their counterparts taking traditional lecture and textbook-based numerical methods courses.

Blunt (2009: 1–11) conducted a causal-comparative exploratory study to examine the difference in academic achievement between university students of 3rd year business studies in Arlington who used a management video game, such as *Business: Industry Giant II*, *Economics: Zapitalism*, and *Management: Virtual U*, and those who did not. The differences explored were based on gender, ethnicity and age. Findings of this study provided evidence that classes using the game had significantly higher mean scores than those that did not use the game. However, there was no significant difference between male or female scores or between ethnic groups, while both genders and ethnic groups scored significantly higher with game play. Age difference was the only variable producing significant differences, namely students aged 40 years and under scored significantly higher with game play, but students aged 41 and over did not.

When evaluating the E-Junior application, Wrzesien & Alcañiz Raya (2010: 178–187) reached the main conclusion that the serious virtual world does not present a statistically significant difference in relation to learning effectiveness when compared with the traditional type of science and biology class. By contrast, their findings show that the students in the virtual group enjoyed the class more, were more engaged, and participated more than the students in the traditional group. The results of this study highlight the idea that educational games must be carefully chosen and applied in order to help students learn while playing. In this line of thought, in a review of game-based learning prepared for the JISC e-Learning Programme, de Freitas (2006: 5) emphasized that findings from the literature review show that:

> "(…) the key challenge for effective learning with games is for the learner to be engaged, motivated, supported and interested but also importantly for the learning to be undertaken in relation to clear learning outcomes as well as being made relevant to real-world contexts of practice. A key challenge for designers then is to get the correct balance between delightful play and fulfilling specified learning outcomes."

The above short review of the literature yields some interesting conclusions. In the first place, serious games are becoming a hot topic in training and education, as shown in the abundant academic research recently published. Secondly, the potential of serious games for learning and education is indisputable. Thirdly, despite the fact that intercultural serious games are in demand and there is a growing interest in this type of games, most of them are still not published and, thus, are not available either for trainers or researchers (Fowler & Pusch, 2010: 94–115). Consequently, there is an evident need for research and a key issue that remains unanswered is how to prove effectiveness, taking into account that intercultural competence is not an easy concept to grasp. Lastly, to make real advances in the field it is essential to develop rigorous empirical methods of analysis, as well as to determine the factors that may influence the relationship between video games and learning. On writing this discussion, our aim is to move forward in this direction by determining the relationship between playing the *It's a Deal!* serious game and developing intercultural communicative competence in business English.

3. The *It's a Deal!* serious game

Supported technologically by the General Foundation of the University of Alicante, *It's a Deal!* is a serious game generated with the adventure game engine called *Visionaire Studio 3.0*. The video game can easily be installed in a personal computer by clicking on ItsA-Deal.exe. installer. To play it students should have at least an intermediate level of English.

It's a Deal!, following Zyda's (2005: 26) definition of serious games, is "(…) a mental contest, played with a computer in accordance with specific rules that uses entertainment to further (…) strategic communication objectives", in our case intercultural communicative competence in business English. *It's a Deal!* is not a simulation in the sense that it represents a reality unto itself that does not directly represent some real-world event. However, it uses a simulated experience to provide the targeted users, namely business English learners, the opportunity to become aware that each culture has its own rules of the game, as well as to discover which rules apply in British culture and practise using these rules in the different stages encompassed in a business transaction. Unlike in the case of other simulation games involving intercultural encounters, in *It's a Deal!* the focus is on the impact of culture on the individual's linguistic behaviour, since this serious game shows a didactic application of the cross-disciplinary model (Guillén-Nieto, 2009a: 31–68) for the analysis of intercultural communicative competence between Spaniards and Britons that was developed within the framework of the COMINTER-SIMULNEG project (I + D + I HUM2006-12989).

3.1. The didactic methodology employed

The didactic methodology employed in the creation of the *It's a Deal!* serious game draws on Constructionism, an educational theory developed by Papert (1993a, 1993b, 1996), and experiential learning ideas (Kolb, 1984; Kolb, Boyatzis, & Mainemelis, 2001; Kolb & Fry, 1975). The students playing *It's a Deal!*, motivated by the plot of the video game, are likely to explore the reality that surrounds them, rethink the social interaction and communication strategies to be used in each business situation, add them to their bank of existing knowledge, and assimilate them as the most effective and appropriate response that should be given to similar communication problems arising in real life.

When playing *It's a Deal!*, the students go through a three-stage learning process in which each stage focuses on a particular intercultural variable, namely *intercultural awareness*, *intercultural knowledge*, and *intercultural competence*.

Stage 1: Sensitization: *Intercultural awareness*. This refers to the development of both cultural awareness, namely recognizing ourselves as part of a speech community that has been mentally programmed at the collective level, and intercultural awareness which entails being aware of the existence of communities with different value orientations and linguistic behaviour to our own.

Stage 2: Developing *intercultural knowledge*. This refers to the knowledge of: (a) the value dimensions affecting human communication and social interaction, and (b) the culture-specific value orientations of the groups involved in the intercultural scenario, in our case Spaniards and Britons.

Stage 3: Acquiring *intercultural communicative competence* in business English. This refers to the ability to understand the linguistic rituals of behaviour, rhetorical conventions, and communication strategies of business English, and use this understanding to communicate with British people in English effectively and appropriately.

3.2. The structure of It's a Deal!

It's a Deal! provides users with an introduction in which the context of the game and main challenge, to make a deal with the major toy distributor in the UK, TAW Ltd., is explained. It also gives players some basic guidelines and instructions about the function of the devices that they will need to use to interact with the environment and solve puzzles. Fig. 1 portrays the main screen of *It's a Deal!* and Fig. 2 shows the interactive devices provided to players: the glove, the loudspeaker and the magnifying glass.

Once the users are familiarized with the game setting and the interactive devices in Episode 0, a series of six interrelated episodes will be gradually presented to them as they make progress in the video game.

Episodes 1 to 6 use simulated experience to let users see the different stages involved in a sales operation, specifically making contact, asking for a quotation, placing an order, advising of despatch, delivering the goods, and making payment. The episodes have been created using the scene design technique. Each episode is encapsulated in a scene, and each scene is divided into a series of screens simulating business communication situations. In these situations, the user, playing the avatars, Elia or Abel, will have to make decisions as to the best way to accomplish certain business tasks by choosing among different options. Figs. 3, 4 and 5 illustrate a multiple-choice business task, a cross-cultural business situation and a negotiation respectively.

Each time users choose an option, ranging from maximum to minimum effectiveness and appropriateness in business English, *It's a Deal!* gives them an idea of the consequences of their decisions and actions. The video game also scores the player's performance in each episode and a final assessment is produced at the end of the video game.

It is essential for the user to recognize the most effective and appropriate way to carry out such business tasks in English in order to achieve certain specific didactic goals, that is, to develop awareness of a particular value orientation and how it affects specific language patterns of behaviour in business English. Therefore, the game requires players to use their cognitive skills, since it encourages problem solving, creative thinking, lateral thinking, investigation and trial and error, all of which are valuable in professional and academic contexts. At the end of the video game, the user will have overcome all the conflicts encountered in the different scenes by applying the right communication strategies. This is verified by means of a debriefing report after each episode in which players are invited to reflect on their performance as well as on the level of intercultural communicative competence reached. Fig. 6 shows the debriefing report at the end of Episode 3.

3.3. Curricular foundations of It's a Deal!

This serious game provides students of English as a second or foreign language in general, and those of business English in particular, with a complementary learning tool that may enhance their intercultural communicative competence in business contexts in which English

Fig. 1. Main screen. *It's a Deal!*, 2011.

Fig. 2. Interactive devices: The glove, the loudspeaker and the magnifying glass. *It's a Deal!*, 2011.

is commonly used as the *lingua franca*. More specifically, it supplies a relevant means of letting learners practice their intercultural business communication skills in an autonomous way and in a safe learning environment that uses simulated experience to recreate the day-to-day running of a Spanish toy making company, *Las Heras Hermanos S.L.* It also gives the user, taking the roles of the avatars, Elia and Abel, the opportunity to deal with the intercultural communication problems the company faces when dealing with the British, incarnated in the avatar, George Watts, purchase manager of the British toy distributing company, TAW Ltd. Consequently, *It's a Deal!* can be a powerful means of testing specific intercultural communicative competences and sub-competences in business settings, since students recognize that the tasks to be performed in English can be transferred to real-life situations.

4. Materials and methods

4.1. Hypothesis and research questions

This paper hypothesizes that the immersive, all-embracing and interactive learning environment provided by *It's a Deal!* may contribute to develop and enhance the users' intercultural communicative competence, namely "(…) the complex of abilities needed to perform
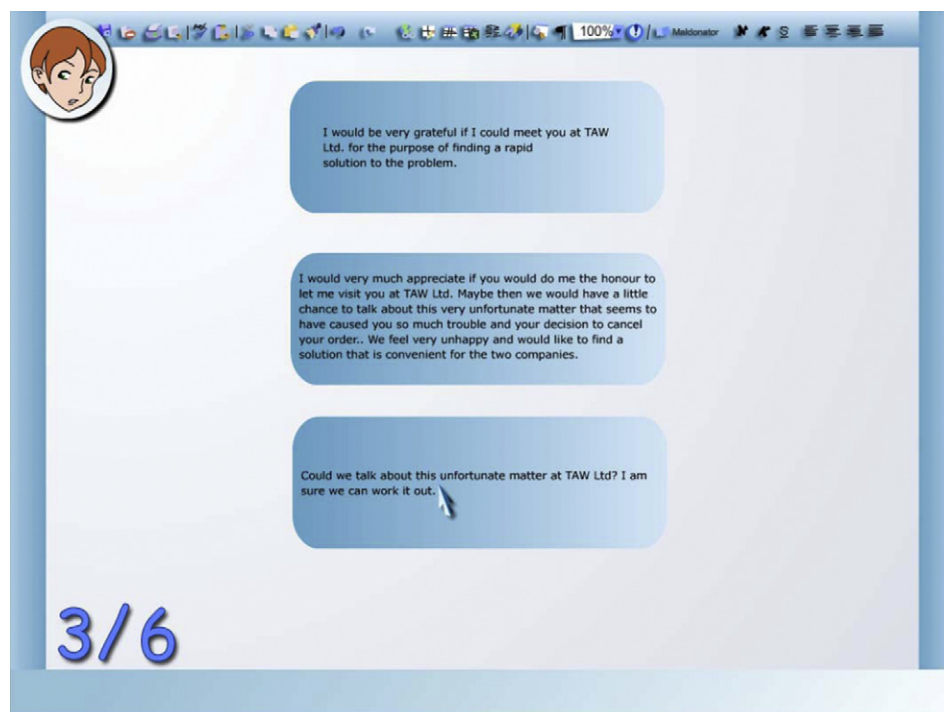

Fig. 3. Example of a multiple-choice business task. *It's a Deal!*, 2011.

Fig. 4. Example of a cross-cultural business situation. *It's a Deal!*, 2011.

effectively and appropriately when interacting with others who are linguistically and culturally different from oneself" (Fantini, 2005: 1), in our case with Britons in a commercial transaction in which English is used as the *lingua franca*.

The study attempts to answer three main research questions: (a) Did the students sampled improve their *intercultural awareness*, *intercultural knowledge* and *intercultural communicative competence* in business English at the end of the experiment? (b) If they improved their intercultural learning, what are the factors influencing such improvement? And (c) if they did not improve their intercultural learning, what are the factors influencing such failure?

4.2. Participants

The game participants who volunteered to take part in the study were all students of English Studies at the University of Alicante in the academic year 2010–2011. One hundred and six students completed both the pre-test and the post-test questionnaires, and played *It's a Deal!* A sample of fifty students was selected randomly for the empirical study. To analyze the composition of the group, different biographical variables were considered, namely *sex*, *academic year*, *level of English*, *previous training in intercultural business communication*, and *frequency of video game play*. Data were collected and analyzed using PASW Statistics 18 software. The frequency tests yielded some interesting findings about the makeup of the group:

Firstly, the percentage of female students (72%) clearly surpassed that of the male students (28%).

Secondly, regarding the frequency distribution of students per academic year, the highest percentages corresponded to first year students (48%) and third year students (44%) of English Studies. The rest of percentages were distributed in the following way: Second year students (4%), fourth year students (2%) and fifth year students (2%).

Thirdly, the students' level of English was found to be intermediate, namely between B1 (24%) and B2 (First Certificate) (36%), followed by C1 (Advanced) (22%), A2 (Beginner) (12%), C2 (Proficiency) (2%), and native speaker (4%).

Fourthly, only 4% reported having had previous training in intercultural business communication before.

Lastly, looking at the frequency with which the students sampled play computer games, the results obtained indicated that the vast majority of the students surveyed were either casual players—34% playing once or twice a year—or standard gamers—34% playing once or twice a month. The rest of the students were distributed as follows: 12% never or hardly play, 12% play almost every day, and finally 8% play almost every week.

Fig. 5. Elia and George Watts negotiating at TAW Ltd in London. *It's a Deal!*, 2011.

Fig. 6. Debriefing report at the end of Episode 3. *It's a Deal!*, 2011.

4.3. Instruments

In order to collect both qualitative and quantitative data from the students sampled, the following instruments were used: (a) a pre-test questionnaire, (b) informal observation of the students while playing the video game, and (c) a post-test questionnaire. To make sure that the use of English did not pose any communication barrier to the students surveyed and eventually distort the results, students were given the opportunity to choose the language in which they wanted to read and answer the questions. In the following subsections, we will be looking at each questionnaire in turn in further detail.

4.3.1. The pre-test questionnaire

A week before the study began, the students were asked to fill in an electronic pre-test questionnaire, which was designed with LimeSurvey 1.91 beta release, and submit it to the researchers. The main aim of this questionnaire was to assess the students' previous knowledge regarding intercultural communication between Spaniards and Britons in business settings in which English is used as the *lingua franca*. The pre-test questionnaire was based on scales and divided into two parts. The first part concerned biographical information, such as gender, nationality, the year they are in, level of proficiency in the English language, having lived in an English speaking country, previous background in intercultural business communication, previous experience in playing serious video games and frequency of computer gaming. The second part was in fact a pre-knowledge test. It consisted of twenty four items exploring three variables: (a) *intercultural awareness*, (b) *intercultural knowledge*, and (c) *intercultural communicative competence* (Guillén-Nieto, 2009a, 2009b; Guillén-Nieto & García-Yeste, 2009; Guillén-Nieto & Pernías-Peco, 2009). The twenty four items were developed by the authors of this discussion drawing on the instructional content of *It's a Deal!* and were carefully selected after having tested them with a reduced sample of 15 informants. Students were specifically asked to rate on a 5-point scale (totally in disagreement, in disagreement, neither in agreement nor in disagreement, in agreement, totally in agreement) the degree to which they agreed with the statement that related to one of the already mentioned three variables (see Appendix 1).

4.3.2. Informal observation of the students while playing the video game

The objective of the informal observation of the students playing the video game was to collect as much information as possible on their engagement, attention, involvement, enjoyment, difficulties, and the time needed to complete the video game. Indeed, this record of the player's reaction to game play, or debriefing, is one of the key stones of the research programme of many recent studies on video games as one of the essential elements that foster learning and, thus, effectiveness (Faria et al., 2009; Fowler & Pusch, 2010; Garris et al., 2002; Harteveld, Guimarães, Mayer, & Bidarra, 2010; Thompson et al., 2010) and could encompass other assessment procedures such as the use of discussion sessions (Charsky, 2010), automatic session logs (Backlund et al., 2010), or even performance metrics and live charts (Kuriger et al., 2010).

4.3.3. The post-test questionnaire

A week after the students had played *It's a Deal!*, they were asked to fill in an electronic post-test questionnaire, which was designed with LimeSurvey 1.91 beta release, and submit it to the researchers. The post-test questionnaire was divided into two well-defined parts. The first

was a feedback test consisting of two sections: (a) general feedback and (b) experience evaluation. The general feedback section comprised three items. The first item asked the students how long they had taken to complete the *It's a Deal!* video game using a scale, with the following time spans: less than 2 h, between 2–3 h, about 5 h, and more than 5 h. The second and third items were open-ended questions enquiring about the major strengths and weaknesses of *It's a Deal!* As it was previously stated, this section of the experiment was part of the debriefing process of the game and intended to make players reflect upon their acquisition of the intercultural competence and their experience with the game.

The experience evaluation section contained thirty items examining six dimensions (variables), namely instructional content, game dimensions, game cycle, debriefing, perceived educational value, transfer of learnt skills and intrinsic motivation. These were borrowed from the learning effectiveness evaluation models developed by Garris et al. (2002: 441–467); Wrzesien & Alcañiz Raya (2010: 178–187); and Yusoff et al. (2010: 45–51). Students were asked to rate on a 5-point opinion scale (definitely yes, probably yes, probably no, definitely no, I don't know) the degree to which they agreed with the statement that related to one of these six dimensions (see Appendix 2).

The latter part of the post-test questionnaire consisted of a post-knowledge test including the same items as the pre-knowledge test but arranged in a different order. The purpose of asking the students sampled to complete the same test after playing *It's a Deal!* was to measure their performance and examine whether or not it had actually improved as regards the three variables under study, that is to say, *intercultural awareness*, *intercultural knowledge*, and *intercultural communicative competence*, which were defined in Section 3.1.

4.4. Procedure

In the first place, the students were asked to fill in the pre-test questionnaire in order to determine the type of students surveyed and their prior knowledge of the above mentioned variables. Secondly, the students played *It's a Deal!* Thirdly, all the students in the sample were asked to complete the post-test questionnaire, consisting of a feedback test and a post-knowledge test to assess their advance in the three variables under study. Then the data collected from the study were analyzed both qualitatively and quantitatively. Finally, the results obtained were compared and contrasted intra-group, for the purpose of finding any significant differences that may confirm whether or not there is an improvement in intercultural communicative competence as a result of the use of the *It's a Deal!* serious game in business English teaching. The qualitative analysis of the data was done using Atlas-ti v. 6.1 and the quantitative analyses of the data were performed using PASW Statistics 18 software.

5. Results

This section presents the most relevant findings.

5.1. Informal observation of the students while playing the video game

The students seemed to be very enthusiastic about the idea of playing a serious video game, which adds to the widespread perception that video games are motivational (Bourgonjon, Valckle, Soetaert, de Wever, & Schellens, 2011; Dempsay et al., 2002; Faria et al., 2009; Garris et al., 2002). Before playing, they were given the plot of the video game to read and were given instructions about the function of the basic interactive tools they could use to solve puzzles: "You can explore the setting and objects by clicking on the magnifying glass, dragging it to the place or object you would like to explore and clicking on it"; "You can pick up the objects you may need by clicking on the hand, dragging it to the object you would like to pick up and clicking on it"; "You can make new characters speak by clicking on the loudspeaker, dragging it to the character you would like to speak and clicking on it", "You can get in and out of rooms by clicking on doors", etc. During the video game session, the students were deeply engaged and immersed in the game to the extent that they forgot about the time, let themselves go, and even burst out laughing occasionally. Although some students managed to complete the video game in an hour and a half, namely pro-gamers, on average it took each student 2 h and a half to complete the video game. Interestingly enough, Episode 1 was found to be the most intricate by casual and standard game players. In this respect we agree with Backlund et al. (2010: 166) when they claim that video game playing is hard and we have to be conscious that it is harder if combined with purposeful learning outcomes; besides, for Dempsay et al. (2002: 163) this could be a factor influencing bad gaming design. Therefore, the game cycle has to guarantee, as it was the case of *It's a Deal!*, sufficient training at the beginning of the game to avoid interferences in learning.

5.2. Comparison of the results obtained in the pre-knowledge and post-knowledge tests

In order to test the learning effectiveness of the *It's a Deal!* serious game, the mean of the results obtained for each of the three variables making up the pre-knowledge and post-knowledge tests (see Appendix 1), that is *intercultural awareness* (V1), *intercultural knowledge* (V2) and *intercultural communicative competence* (V3), was first calculated separately. As the reader can see, Table 1 illustrates a percentage

Table 1
Comparison of the results obtained in the pre and post-knowledge tests.

	Test	N	Mean	Std. Deviation	Std. Error Mean
V1 Mean	Pre-test	50	3.2033	.44834	.06340
	Post-test	50	**3.4267**	.45942	.06497
V2 Mean	Pre-test	50	3.3167	.38869	.05497
	Post-test	50	**3.5567**	.39643	.05606
V3 Mean	Pre-test	50	3.3333	.33034	.04672
	Post-test	50	**3.6567**	.39182	.05541

Table 2
Results of the *t*-test for equality of means.

		Levene's test for equality of variances		*t*-test for equality of means					95% confidence interval of the difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
V1 Mean	Equal variances assumed	.113	.737	−2.460	98	**.016**	−.22333	.09078	−.40349	−.04318
	Equal variances not assumed			−2.460	97.942	**.016**	−.22333	.09078	−.40349	−.04318
V2 Mean	Equal variances assumed	.557	.457	−3.057	98	**.003**	−.24000	.07852	−.39581	−.08419
	Equal variances not assumed			−3.057	97.962	**.003**	−.24000	.07852	−.39581	−.08419
V3 Mean	Equal variances assumed	1.451	.231	−4.461	98	**.000**	−.32333	.07248	−.46716	−.17950
	Equal variances not assumed			−4.461	95.277	**.000**	−.32333	.07248	−.46721	−.17945

increase in the mean of each variable in the post-knowledge test as compared with the pre-knowledge test. The values in bold show this percentage increase.

Then a *t*-test was performed for the purpose of determining whether the difference observed between the pre and post-knowledge tests was statistically significant or not. As the reader can see from Table 2, the *t*-test showed statistically significant differences in the results obtained for each of the three variables under study, to be exact the difference observed in both V1 (*intercultural awareness*) ($t = 2.460$, $p = .016$) and V2 (*intercultural knowledge*) ($t = 3.057$, $p = .003$) was significant ($p < .005$), and the difference perceived in V3 (*intercultural communicative competence*) ($t = 4.461$, $p = .000$) was highly significant ($p < .001$). The values in bold highlight statistical significance in Table 2. These results confirm most of the perceptions stated in the literature and corroborate that videogame playing may have pedagogical benefits (Almeida & Jauch, 1992; Dempsay et al., 2002; Garris et al., 2002). In this particular case we did not find evidence that gaming interfered in learning as hinted by Backlund et al. (2010: 165).

Moreover, in order to check whether or not all the students sampled had learnt equally, the mean of the increment of the grades obtained in the knowledge test (post-knowledge test grades minus pre-knowledge test grades) was calculated and correlated with the grouping variables sex, academic year, level of English, previous training in intercultural business communication, and frequency of video game play. Only the grouping variable related to the level of English was significantly negatively correlated with the increment mean ($p = .004$), as depicted in Table 3.

The statistical test for correlation between learning effectiveness and level of English shows that students in levels A2, B1 and B2 English proficiency made more intercultural learning progress than the students in levels C1 and C2. Curiously enough, the native speakers participating in the survey were in fact the ones that exhibited the least significant learning progress. Fig. 7 shows a dispersion graph of the learning effectiveness data in Table 3. Specifically, the dispersion graph is a graphical representation of the interaction between the intercultural learning progress made by the students sampled and their level of English proficiency.

As shown in Fig. 7, since the data are concentrated toward the numbers 2, 3 and 4, we can state that the students in the lower levels of English proficiency (A2, B1 and B2) learnt more than the students in the upper levels (C1, C2 and native speaker). Needless to say, this finding will need to be supported with further research applied to larger groups of students, especially students in C1 and C2 levels of English proficiency, and native speakers.

5.3. Results obtained in the feedback test

5.3.1. General feedback

The qualitative analysis of the data was done using Atlas-ti v. 6.1. This analysis produced 48 positive comments and 44 negative comments. Looking at the positive comments, in 31.3% of them the students found the video game educational, in 27.1% entertaining, in 27.1% instructive because it helps users to familiarize themselves with the business world, in 25% instructive because it helps learners to gain knowledge of intercultural business communication, in 10.4% instructive because it helps users to learn business English letter writing rhetorical conventions. In 16.7% of the comments students reported having enjoyed the experience of learning through a game, and in 10.4% they valued the combination of good design, graphics, plot and adventure. Last but not least, in 10.4% of the comments students found the debriefing reports provided in the game a valuable learning tool. These opinions, as part of the debriefing of the game, show an analogy with the strengths of videogame playing as stated in previous studies (Backlund et al., 2010; Dempsay et al., 2002; Garris et al., 2002), and, furthermore, sustain the idea that learning is truly achieved when the learning outcomes are reviewed and there has been some reflection upon this learning (Garris et al., 2002: 454). The results of the students' feedback show complete accordance with two of the seven measures proposed by Faria et al. (2009: 470–471) in their framework to assess effectiveness, albeit "realism" and "simplicity of use". The rest of the measures proposed focus on technical aspects that are set beyond the scope of this paper.

Table 3
Learning effectiveness correlated with level of English proficiency.

		Learning effectiveness (pre and post-knowledge test substraction mean)
Level of English	Pearson correlation	−.401[a]
	Sig. (2-tailed)	.004
	N	50

[a] Correlation is significant at the .01 level (2-tailed).

Level of English Pre & Post Test Grade Differences

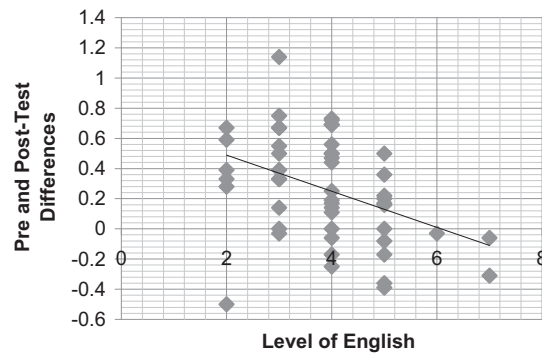|	
5	0.36
4	0.11
4	-0.06
5	0.2
5	0
4	0
5	-0.39
6	-0.03
4	0.14
2	0.39
5	-0.08
5	0.5
4	0.5
4	0.25
4	0.47
3	0.14
2	0.28
2	0.67
5	-0.17
2	0.33
3	0.67
3	0.75
3	0.33
7	-0.31
4	0.17
3	-0.03
3	1.14
3	0.33
3	0
4	0.44
5	0.17
2	0.59
4	-0.17
5	-0.36
4	0.5
7	-0.06
4	0.72
3	0.67
3	0.5
4	0.69
4	-0.25
3	0.55
4	0.69
3	0.39
4	0.56
4	0.73
2	-0.5
4	0.19
5	0.22
5	0.16

Fig. 7. Dispersion graph of the intercultural learning progress per level of English.

Considering the negative comments, in 25% of them students thought that the feedback provided was repetitive; in 18.2% they considered that there was lack of instructions; in 15.9% they would have preferred to read the comic dialogues in order to play faster. In 9.1% they found Episode 1 too long; and finally in 6.8% they considered that looking for the objects needed to solve puzzles was time-consuming. These findings correspond to the negative factors and dangers of video game play for learning purposes as stated in previous studies (Backlund et al., 2010; Dempsay et al., 2002).

5.3.2. Experience evaluation

The analysis of the experience evaluation section (see Appendix 2) showed that the mean scores obtained for each of the variables under study were high, since they were all above 4 out of 5. The descriptive statistics are shown in Table 4 below. The variable with the highest score was ExpV5 (*Perceived educational value*) with a mean of 4.7, followed by ExpV1 (*Instructional content*) and ExpV4 (*Debriefing*) both with a mean of 4.5, ExpV3 (*Game cycle*) with a mean of 4.3, ExpV6 (*Transfer of learnt skills and intrinsic motivation*) with a mean of 4.2, and finally ExpV2 (*Game dimensions*) with a mean of 4.1. The mean scores are highlighted in bold type in Table 4. These results convey the idea,

Table 4
Descriptive statistics of the experience evaluation test.

	N	Minimum	Maximum	Mean	Std. Deviation
ExpV1: Instructional Content	50	3.67	5.00	**4.5600**	.34954
ExpV2: Game Dimensions	50	2.67	5.00	**4.1533**	.52147
ExpV3: Game Cycle	50	3.00	5.00	**4.3133**	.50355
ExpV4: Debriefing	50	3.33	5.00	**4.5333**	.44160
ExpV5: Perceived Educational Value	50	3.80	5.00	**4.7520**	.28731
ExpV6: Transfer of Learnt Skills & Intrinsic Motivation	50	3.00	5.00	**4.2300**	.54828
Valid N (listwise)	50				

supported in previous studies (Garris et al., 2002: 461; Raphael et al., 2010: 206), that a balanced perception of the construct variables of a video game enhances learning and effectiveness.

In order to determine the factors influencing the students' improved intercultural learning, correlation tests were performed between each of the three variables in the post-knowledge test and each of the six variables in the experiential test. The results obtained were not significant.

6. Discussion

This section contains the interpretation and explanation of the data. Outcomes are interpreted within the context of the research questions that were posed in the beginning of this paper.

Firstly, the analysis indicates that the students were enthusiastic, motivated and fully involved in the experiment. For many of them this was the first time in their lives they had played a serious game. It also shows that their English level was intermediate and therefore, suitable to play *It's a Deal*!, as well as the fact that the vast majority had never had any training in intercultural business communication before.

Secondly, the study shows that there were significant differences ($p < .005$) between the results obtained in the pre-knowledge and post-knowledge tests as regards *intercultural awareness* (V1) and *intercultural knowledge* (V2). Furthermore, highly significant differences ($p < .001$) were found concerning *intercultural communicative competence* (V3). Consequently, we can say that as a result of playing *It's a Deal!*, the students sampled improved their intercultural learning, especially their intercultural communicative competence, which was why *It's a Deal!* was created. In addition, the tests for the correlation between the effect the video game had on intercultural learning and a number of grouping variables we performed showed that only the variable related to the *level of English* was significantly negatively correlated with the increment mean ($p = .004$) in the post-knowledge test. In other words, the video game had a larger learning effect on the students in A2, B1 and B2 levels of English proficiency than on the students in C1 and C2 levels and native English speakers.

Thirdly, as regards the factors influencing such intercultural learning improvement, we tried to draw a correlation between each of the six variables making up the experiential test and each of the variables considered in the pre-knowledge and post-knowledge tests. It was not possible for us to determine which factor or factors influenced the students' improved intercultural learning more strongly than the others because the results of the correlation tests were not significant. However, it is worth considering the fact that the mean scores obtained for each of the variables making up the experiential test were quite high and very similar: *instructional content* (4.5), *game dimensions* (4.1), *game cycle* (4.3), *debriefing* (4.5), *perceived educational value* (4.7), and *transfer of learnt skills and intrinsic motivation* (4.2). Therefore, we may assume that in the case of the *It's a Deal!* video game, learning effectiveness resulted from the balanced combination of all six dimensions considered for the evaluation of learning effectiveness of serious video games (Garris et al., 2002: 441–467; Wrzesien & Alcañiz Raya, 2010: 178–187; and Yusoff et al., 2010: 45–51). In fact, "balanced" was one of the most recurrent adjectives used by the students sampled when responding to the general feedback questions.

7. Concluding remarks

This discussion provides empirical evidence as regards the learning effectiveness of serious games. Specifically, the study focuses on the evaluation of the *It's a Deal!* serious game in business English teaching. Findings of the study carried out with a selected sample of fifty students of English Studies at the University of Alicante in the academic year 2010–2011 demonstrate that *It's a Deal!* may be considered to be an effective learning tool for the teaching of intercultural communication between Spaniards and Britons in business settings in which English is used as the *lingua franca*. In particular, the game had a large learning effect on *intercultural communicative competence*. The study also documents correlating factors that make serious games effective, since it shows that the learning effectiveness of *It's a Deal!* stems from the correct balance of the different dimensions involved in the creation of serious games, specifically *instructional content*, *game dimensions*, *game cycle*, *debriefing*, *perceived educational value*, and *transfer of learnt skills and intrinsic motivation*. It is true that the immersive, all-embracing and interactive learning environment provided by *It's a Deal!* may have contributed to develop and enhance the students' intercultural communicative competence, due to its educational contents and clear pedagogic objectives. Unlike other serious games, *It's a Deal!* is not visually stunning. However, it is didactic, which was the intention of the two teams involved in its creation, the didactic team and the technical team. Finally, the findings of the present study should be supported with similar analyses applied to larger groups of students in various levels of English proficiency, and compared to the results obtained with groups of students from different academic and professional backgrounds in order to find out whether or not there are significant differences concerning the learning effectiveness that is shown by the tests performed in this piece of research.

English Studies at the University of Alicante for their engagement in the implementation of the *It's a Deal!* serious game and their active participation in the study carried out.

Appendix. Supplementary data

Supplementary data associated with this article can be found in online version at doi:10.1016/j.compedu.2011.07.015.

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