BUSINESS SIMULATORS AND LECTURER'S PERCEPTION! THE CASE OF UNIVERSITY OF ALGARVE

Tatiana Nikolaevna Kikot[1], Gonçalo Jorge Morais Costa[2], Silvia Conceição Pinto Brito Fernandes[3]
Research Centre for Spatial and Organisational Dynamics- University of Algarve[1,3], Autónoma University of Lisbon/Centre for Computing and Social Responsibility- De Montfort University[2]

Abstract

The purpose of this paper is to investigate the usage of simulation/serious games in the University of Algarve (Portugal), because these novel learning environments are still on an early stage of adoption. Members of the Faculty of Economics (in a total 60 lecturers and their assistants) participated in this study through a mixed survey (closed and ask for agreement queries). The empirical evidences denote interesting results: (i) a response rate of 43 percent; (ii) these tools increase learning engagement; (iii) the lack of information and not sufficient alignment with the course unit hinders the uptake of these technologies within classrooms; (iv) lecturers have a positive perception and consider them as valuable for students' better learning. Hence, this survey provides a good platform for future research and approaches how to promote a better exploration of simulation/serious games and their integration into course curriculum. To conclude, this paper will be divided into five sections: (i) research statement; (ii) research design (aims/objectives, research methodology and data collection/analysis); (iii) findings (lecturers' profile, awareness, experiences and results summary); (iv) limitations and future work (methodological limitations and tools/analysis upgrade); and, (v) conclusions.

1 Introduction

Technology, namely Information Communication Technologies (ICT), has a profound influence over society and is a widely debated topic in literature (e.g., Castells *et al.*, 2006). Education is an essential pillar of contemporary society and ICT influence over it is extremely remarkable, which for instance Silva, Rogerson & Alvarez (2011) demonstrate. In this case, the authors will outline the perception of lecturers regarding business simulators within the University of Algarve (UAlg) (Faculty of Economics).

Although, how to define Game-based Learning (GBL)? A straightforward retort is games designed for learning and behavioural change (Connolly *et al.*, 2012); so, the key difference regarding digital commercial games (DCG) is learning instead of entertainment or recreation (Corti, 2009). Despite substantial studies indicate games, simulators or others non-traditional tools as valuable teaching methods (Guillén-Nieto & Aleson-Carbonell, 2012), their practical implementation is still in an early stage (Connolly *et al.*, 2012).

While simulation games are becoming more and more widely distributed in education environment, very little is known about their technical features or how to

integrate them in a curricular unit (Eastwood & Sadler, 2013). Literature focus has been on comparing game playing to lecturing (Pasin & Giroux, 2011), while lecturers recognise many obstacles in applying games in a course unit. Consequently, their behaviour hinders the uptake of GBL in higher education (Wall & Vian, 2008). If higher education institutions want to engage game-based learning in their course units, it is significant to understand the teacher's cognition framework as for instance: awareness, perception, reasoning, and judgment, as a basis for developing strategies.

To conclude, this paper will be divided into five sections: (i) research statement; (ii) research design (aims/objectives, research methodology and data collection/analysis); (iii) findings (lecturers' profile, awareness, experiences and results summary); (iv) limitations and future work (methodological limitations and tools/analysis upgrade); and, (v) conclusions.

2 Research statement

In spite of games for education, decision making, problem solving, teamwork and corporate marketing be emerging technologies; these have been under the media spotlight and fame (Damassa, 2010). However, true adoption and organisational implementation of games in Portugal is still at an early, experimental stage (European Commission, 2012). And, the Horizon Report 2014 (NMC) Higher Education Edition advocates a two/three years time period for global GBL adoption (Johnson *et al.*, 2014).

The number of games that are currently available for educational institutions and lecturers to explore in their multiple courses are thousands; although, the adoption rate can be considered as low. Some reasons for lecturers negligence are (Dede, 2012): (i) huge scepticism about the educational value of games (lack of experimental history); (ii) most lecturers are neither gamers nor game developers which constraints their perception; (iii) as more experienced the process of adaptation becomes, more sophisticated, exquisite and complex is to integrate a game within a course unit; (iv) realise the goal of advancing technologies of everyday life in education through creative application will create a more powerful way of learning in schools, communities and workplace.

3 Research design

3.1 Aims/objectives

This study acknowledges two sub-research queries of the first co-author's PhD research on GBL exploration, i.e., (i) how extent the university strategy influences GBL implementation or usage?; and, (ii) which are the reasons to integrate GBL in a course unit? (lecturers view). The authors option, include just lecturers behaviour, acknowledges three analytical assumptions: (i) empirical evidences richness from lecturers and students (e.g., Kikot *et al.*, 2013); (ii) publication strategy (see Kikot *et al.*, in press); and, (iii) the longitudinal remarks (further details on research methodology subsection).

Therefore, the PhD main research question is: can GBL (*Cesim Global Challenge*, *Cesim SimBrand* and *Cesim SimFirm*) be a useful and productive tool to support Management learners for effective learning towards complex contexts while enhances

engagement? The choice of these three business simulators is explained throughout two analytical dimensions: (i) University of Algarve strategy for Business Studies (adoption and implementation of these games); and, (ii) rich explanation (bond to interpretive research), since it will be possible to obtain insights from a wider group of lecturers and learners (Management, Economics and Marketing Bachelors).

3.2 Research methodology

The overall research acknowledges an interpretive longitudinal multiple case study design within a qualitative frame, because "qualitative researchers aim not to limit a phenomenon- make it neat, tidy, and comfortable- but to break it (...) so that a description of the phenomenon, in all of its contradictions, messiness, and depth, is (re)presented" (Mayan, 2009, pp. 11). And, the interpretive philosophy aims to capture information on more exploratory "how", "what" and "why" questions, to highlight insights and subjectivity of people opinions and context (Walsham, 2011).

According to Yin (2009), case studies can be used to explain, describe and explore the events in the everyday environment in which they occur. In this case, UAlg is a public university located in the southern region of Portugal with four distributed campuses- Faro (three) and Portimão (one) with around 750 permanent lecturers devoted to undergraduate and postgraduate courses in Earth/Marine Sciences and Health to Engineering and Technology, Tourism and Social Sciences/Humanities (including Management). The longitudinal milestones frame every semester since academic year 2012/2013 (year zero- MPhil), as well as *Cesim Global Challenge* and *Cesim SimFirm* are explored on a first semester course (*Jogos da Empresa*) unit while *Cesim SimBrand* on the second semester (Marketing).

Finally, some authors (e.g., Bourgonjon *et al.*, 2013; Connolly *et al.*, 2012; Flecther & Tobias, 2006), denote a lack of qualitative studies through a longitudinal approach on learners' engagement and outcomes, as well as lecturers game-based learning experience. Hence, the chosen analytical lenses are crucial for the body of knowledge.

3.3 Data collection and analysis

3.3.1 Overview

Data collection acknowledges a mixed survey, close and open-ended queries, which is a traditional and important way to collect data about values or opinions (Burns, 2000). Their analysis acknowledges: (i) a numerical approach for the close queries, despite potential criticism (Alaranta, 2006); and, (ii) a hermeneutical approach, i.e., relate the parts and the whole (Geanellos, 2000) for the open queries.

Data analysis invokes a hermeneutical model in order to identify textual data, because its basic question is: what is the meaning of such text? (Radnitzky, 1970) Besides, Tan, Wilson & Olver (2009) advocate that a systematic and continuous process (feedback amongst the parts and the whole) enable an interpretive and detailed analysis. For this achievement, the authors enabled seven analytical procedures (Mayring, 2003): (i) proper communication model (empirical results); (ii) systematic and rule-based analysis (content units); (iii) interpretive categories reviewed through feedback loops (two reviews); (iv) reference to subject instead of technique (open-code structure); (v) instruments verification (pilot analysis- Kikot *et al.*, 2013); (vi) theory-guided analysis (GBL literature); (vii) trustworthiness (authors procedures). The open-

code structure was ID section_ID query_ID subject_code body. As final note, translation was avoided to minimise lost of sensitive meanings.

3.3.2 Survey design

Lecturer questionnaire (25 questions) is structured as follows:
- section one (participant profiling- 8 queries): biographical information, as for instance gender, age, academic and professional background, prior experience in playing serious games or simulators, frequency of computer gaming and knowledge about ICT;
- section two (new learning environment assessment- 4 queries): includes lecturers' GBL awareness, as well as assessment of GBL basic features and characteristics;
- section three (simulation games/serious games- 12 queries, depending on the chosen scenario: "former user"/"current user" and "never user"): explores lecturers experience with simulation/serious games, their perception of usefulness in teaching, constraining factors for GBL acceptance or rejection and, willingness to try out these games in the future.

In particular, "current users"/"former users" were asked about the primary reason to adopt simulation games and procedures regarding course unit integration. Moreover, the reasons behind their decision to stop exploring business simulators were also investigated. For those who never used business simulation/serious games, i.e. "never users", the following step was to address their sense or willingness to adopt it as well as potential time frame.

To reflect a qualitative methodology queries were initially open-ended; although, previously to this survey version, authors had informal conversations with lecturers to comprehend pre-tests failures (low gathering of opinions and non-plausible response rates). The most common feedback denoted a preference concerning close-ended queries; so, to increase the response rate, this questionnaire enabled two options: (i) the lecturer was invited to answer to open-end queries. However, if desired to skip them, by clicking on a checkbox a list of options would become visible (close-ended queries); (ii) these close-ended queries had a qualitative scale: poor, sufficient, good, and very good. This facilitated the process and provided the necessary data.

4 Findings

4.1 Lecturers profile

The survey was designed through LimeService and sent to 60 UAlg lecturers and their assistants (Faculty of Economics) during the 2^{sd} semester of 2013/2014 academic year. From these 60 invitations to participate into the survey, 53 were received; however, 27 were incomplete, which resulted in a response rate of 43 percent. The vast majority of respondents were between 41-50 years old (65%) and, 55 percent of faculty members were females. Regarding the years of lecturing expertise 60 percent denoted 11-20 years, 30 percent 21-30 years and, 10 percent more than 30 years of experience. From this population, 75 percent were "never users" and 25 percent falls into the "former users"/"current users" category. In addition, the queries related to personal usage of

video games for fun and entertainment purposes enabled the following results: (i) the majority of participants (90%) plays video games, although less than one hour per day; (ii) 30 percent consider themselves as professional users of ICT; and (iii) 15 percent declared lack of knowledge about ICT.

4.2 Lecturers awareness

The majority (58%) of lecturers declared awareness about the concept of GBL, which was justified through their personal definitions (table 1).

Table 1. Definition of GBL- Examples

Section 2- Query 10- Give your definition					
ID	Gender	Age	Experience	Remark	Analysis
2	Female	42	17	[1]*É uma aprendizagem usando simulações ou softwares de jogo interativos para* [2]*obter cenários de forma a comparar, ver consequências e feedbacks*	[1]Learning with computer software; [2]GBL features (feedback)
19	Male	33	8	[1]*...aprendizagem alicerçada na utilização de jogos que tentam reproduzir dimensões dos aspectos da realidade que se pretendem similar...*	[1]GBL features (simulated environment)
22	Male	35	14	[1]*Desenvolver conhecimento numa* [2]*área específica por utilização de um sistema de informação*	[1]Learning with computer software; [2]Specific area
25	Male	54	16	[1]*Uma aprendizagem simulada em que o jogador é colocado numa determinada posição em que deve tomar decisões que têm repercussões (positivas ou negativas)*	[1]GBL features (problem-solving, decision making)
38	Male	44	20	[1]*Game-based learning consiste em recriar através de modelos de simulação, aquilo que são as condições naturais de funcionamento das organizações, para que o jogador possa perceber,* [2]*num contexto isento de riscos, aquilo que são as implicações de determinadas ações/decisões.*	[1]GBL features (simulated environment); [2]GBL features (decision making)
42	Male	45	20	[1]*utilização de simuladores de* [2]*situações reais em contexto profissional*	[1]Learning with computer software; [2]GBL features (simulated

ID	Gender	Age	Experience	Remark	Analysis
					environment)"
54	Female	40	20	[1]*aprendizagem com o apoio de simuladores*	[1]Learning with computer software
58	Female	41	14	[1]*Aprendizagem baseada em jogos informáticos* [2]*relativos às matérias da unidade curricular*	[1]Learning with computer software; [2]Alignment with the course unit"

According to their comments GBL is bounded to simulated learning environments, i.e, computer software that explores real situations. In addition, some lecturers had in mind problem-solving and decision making process as characteristics of GBL. An interesting fact about this query was the number of female answers: merely three! Although it was an expectable outcome, since gender gap in computer playing is well-documented in literature (e.g., Drabowicz, 2014).

The top two characteristics, most valued and considered "very important" by lecturers (44 percent), were problem-solving and learning engagement; and, 6 percent of respondents had low perception (i.e. "poor"") of team work and students assessment. However, "current users"/"former users" believed that problem solving and feedback were very important, while other features as teamwork, collaboration, learning engagement and software compatibility were just important. Though, some stressed that software compatibility, problem solving and learners assessment required improvement (see limitations section).

4.3 Lecturers experiences

4.3.1 "Current users/former users" category

When asked about their prior experiences with virtual simulation/serious games within the classroom, 25 percent of the lecturers declared a positive answer. I.e., had or were currently using simulation/serious games in their courses. The more noticeable comments of this query are outlined in table 2.

Table 2. GBL exploration (reasons)- Examples

Section 3- Query 25- Why did you start to use simulation/serious games in the course unit?					
ID	**Gender**	**Age**	**Experience**	**Remark**	**Analysis**
37	Male	58	25	[1]*analise de sensibilidade* [2]*análise do impacto de variáveis críticas*	[1]Effective analysis; [2]GBL features (impact analysis)
17	Male	43	17	*Razão objetiva: porque já assim acontecia quando*[1] *fui incumbido de lecionar a unidade curricular. Razão subjetiva:* [2]*acredito nas virtudes da metodologia para o ensino da gestão*	[1]Simulator (adopted); [2]GBL (believer)

| 32 | Male | 58 | 25 | [1]*Experimentação dos alunos das decisões reais no processo e causa* | [1]GBL features (decision making) |

According to current/former users, the main objective of business simulation/serious games exploration within a classroom is to increase students' interaction and teamwork. When asked about their expertise or ability to integrate and adopt such games, the most common answer was simple interactions for classroom activities. These lecturers also remarked that their role was primary process guidance, i.e., clarified students' doubts on issues like technical usage or linking supplement information on how to avoid pitfalls (strategy). And the most prominent impacts and trends were learners' activity and engagement, as well as contribution to decision making. However, former users' denoted the lack of alignment with the course unit syllabus as the reason for stopping using simulation/serious games.

4.3.2 "Never users" category

To the 75 percent of lecturers that do not integrated virtual simulations/serious games into their course units, it was given the opportunity to justify their personal choice. The responses did not vary greatly. i.e., the lack of information regarding simulation/serious games (26%) and awareness (similar result) were the most relevant issues for non exploration in their classrooms. Poor adequacy concerning course unit syllabus represented 15 percent of the respondents. These comments enable a potential argument: simulations/serious games must be carefully designed and developed to ensure appropriate learning goals and outcomes.

Other minor obstacles referred by lecturers were lack of time for preparation and funding. These organisational members may not necessarily be willing to put an extra personal effort for: (i) search adequate virtual simulations/serious games; (ii) learn and understand these games technical features; (iii) become proficient users in order to explore them efficiently and enable students engagement.

4.3.3 "All users"

In this section, the authors illustrate lecturers GBL willingness to try out simulation games in the future.

Table 3. Integrate on the course unit- Examples

Section 3- Query 24- Would you like integrate simulation/serious game in the course unit? Explain why.					
ID	Gender	Age	Experience	Remark	Analysis
2	Female	42	17	[1]*Sim, porque é um instrumento interessante, interativo que poderá aumentar a participação e atenção dos estudantes. E poderá ser um meio de ligação com as problemáticas reais que ocorrem na economia*	[1]GBL(learning engagement)
17	Male	43	17	*Sim. Na que atualmente leciono*	[1]Positive

				de Jogo de Empresa, pelos motivos já expostos e em qualquer outra para que existir uma [1]oferta de simulador: Marketing, gestão orçamental, mercados financeiros, etc.	intention to use; [2]Simulation offer
19	Male	33	8	*Quando e sempre que se adapte*	[1]Positive intention
22	Male	35	14	*Não*	[1]Negative intention
25	Female	54	16	*Sim. Porque tenho uma perceção muito boa das simulações de situações reais. Há um maior envolvimento dos participantes*	[1]Positive intention (learning engagement)
29	Male	63	32	*Sim. Benefício para o processo de aprendizagem dos alunos*	[1]Positive intention (benefit learning process)
37	Female	58	25	*Sim. Utilizo*	[1]Positive intention
38	Male	44	20	*Sim, porque este tipo de simuladores procuram aproximar os estudantes daquilo que é a realidade organizacional*	[1]GBL features (simulation environment)
42	Male	45	20	*Eventualmente porque é uma metodologia apelativa e útil*	[1]Positive intention (learning engagement)
44	Female	52	15	*Sim, se ficasse demonstrado que é uma mais-valia para a aprendizagem*	[1]Positive intention (add value)
45	Female	43	20	*Gostaria de experimentar*	[1]Positive intention
47	Female	57	23	*Não. Há outras formas de ensino igualmente aliciantes*	[1]Negative intention
49	Male	43	10	*Talvez. Depende da pertinência e da adaptação às unidades unidades curriculares que lecciono*	[1]Neutral intention
50	Female	48	25	*Sim. Tornaria as aulas mais interessantes. Seria uma forma de motivar os alunos para a aprendizagem*	[1]Positive intention (learning engagement)
52	Male	57	33	*Provavelmente*	[1]Neutral intention
53	*Female*	*46*	*23*	*Não. Não é ajustado ao perfil das unidades curriculares que*	[1]Negative intention (not

				leciono	applicable)
54	*Female*	*40*	*20*	*Não. No momento, estou satisfeita com os métodos de ensino-aprendizagem que uso nas minhas UCs*	[1]Negative intention (not to evolve)
55	*Female*	*42*	*10*	*Sim. Poderia estimular os alunos*	[1]Positive intention (learning engagement)
58	*Male*	*41*	*14*	*Sim. Julgo que tornaria as aulas mais apelativas*	[1]Positive intention (learning engagement)

As regards to future exploration, the majority of UAlg lecturers (Faculty of Economics) seem to be in favour. This is grounded by the fact that over half (78 percent) of all users exhibited a positive intention about simulation/serious games; yet, some more conservative, implicitly declared a potential loss of control or shift of power (i.e., approximately 15 percent). Interestingly, merely 3 respondents indicated an absolute lack of intention. This induces an opportunity for business simulation games to be more widely used within UAlg learning environments (classrooms).

4.4 Results summary

This research analyses simulation/serious games usage by lecturers within UAlg (Faculty of Economics) through Lime survey; and, the key conclusion is an early stage of adoption. Only 25 percent of respondents declared past or current experiences in their lecturing, and the majority denoted a positive feeling concerning learners' interaction increase and teamwork (main reason). On the contrary, "never-users" educators acknowledged the following reasons for their behaviour: (i) lack of information about these games; (ii) non-appropriateness for their course(s) unit(s) which; (iii) preparation time required in order to explore these tools in a learning environment.

Summing up, from lecturers' answers the authors expect a slight increase in simulation/serious exploration within UAlg (Faculty of Economics); however, the issue to convert potential users into adopting simulation games adopters is extremely thorny. That conversion will require several actions, as for instance: (i) foster cooperation between game developers (companies) and lecturers in order to achieve an alignment with the course unit syllabus; (ii) investigate appropriate student assessment tools when adopting simulation games, since traditional methods are an insufficient procedure.

5 Limitations and future work

5.1 Methodological limitations

A trustworthy qualitative research recognises an effort for meaning or validity about data collection (Huxham & Vangen, 2003), so literature acknowledges four quality standards: (i) credibility, results' accuracy through member checking; (ii)

transferability, "thick description"; (iii) dependability, record the research process and documentation; (iv) conformability, data audit. Hence, a systematic approach through interpretative flexibility to open-ended queries (content analysis) is rigorous despite potential subjectivity.

The survey protocol redesign or the response rate (43%) can be criticised; although, the interesting insights from empirical evidences verifies the authors option. Besides, its redesign does not promote a negative influence over a qualitative numerical approach and interpretive flexibility (Doherty *et al.*, 2006; Šuc, Vladušič & Bratko, 2004). And, the authors are aware about the challenges of a "non-main stream" data analysis (for example see Bowen, 2005).

5.2 Tools and data analysis upgrade

With a well-designed survey, the following step for data collection tools is individual or focus groups interviews. While individual semi-structured interviews will allow a comprehension about peoples or opinions, focus groups enable the expression of feelings or perceptions not expressed individually (Gall, Gall & Borg, 2003). This option can be particular useful for sensitive issues (non-adoption) by "never-users". Some keen examples are related with data analysis upgrade, i.e., to figure out the boundaries of software (simulation/serious games) improvement for "current/former users"; or, the true motives behind "never-users" complete negligence concerning simulation/serious games (shift of power?) (e.g., Silva *et al.*, 2013).

6 Conclusions

This contribution denotes an ongoing research project, although the preliminary empirical evidences illustrate promising findings: (i) simulation/serious games increase learning engagement in Management courses; (ii) the lack of information and insufficient alignment with the course unit hinders the uptake of these technologies; (iii) lecturers have a positive perception and consider these tools as valuable for students' better learning.

The research design acknowledges a positive response to the research query, as well as, to the PhD aims/objectives. Data collection procedures and analysis are adequate; however, individual and focus groups interviews will for sure enrich the initial conclusions.

Concluding, this survey provides a good platform for future research on how to promote a better exploration of simulation/serious games. Even so, the leading author expects to receive valuable comments and suggestions during ETHICOMP 2014 for her future research decisions.

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