

**TECHNOLOGY IN ACCOUNTING EDUCATION:
A BUSINESS SIMULATION CASE STUDY**

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TITLE

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ABSTRACT

Accounting education had to evolve in order to acknowledge and take advantage of information technologies. These technologies are important in creating a credible simulation and better support to both students and teachers. We present a qualitative case study of a course of business simulation based on the use of information technologies. Developed by a Portuguese accountancy college, this employment-driven subject relies on two kinds of technologies: educational and entrepreneurial. This learning process improves students' confidence on addressing the challenging professional world. In order to achieve this goal, the college had to deal with significant financial and human resources.

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INTRODUCTION

For accounting education to regain relevance, continuous changes and improvements in the courses of this area are necessary. This learning process must keep up with technological innovation that occurs among the professional accountants. New skills are required to deal with information and information technologies systems.

This paper aims to contribute to the field of accounting education. Studies are lacking on how these information technologies are being used, despite their growing trend. (Ed et al. 2015).

Therefore, we studied a traditional Portuguese accounting school (School of Accounting and Administration of Porto - ISCAP) with more than a hundred years of experience. We analysed how this school responded to actual accounting problems regarding technology. The school redesigned the accounting graduation, adding two courses (Business Simulation Project I and II) with inherently practical nature, based on a complex set of tasks identical to the real business world and on the usage of Information Technology (IT).

In this qualitative case study, we discuss these courses, in operation since February 2003. The aim of our research is to identify how the accounting education in these courses is adapted, and how the new technologies are incorporated and perceived by students and teachers.

This paper is divided into four main parts. In the first part we present a literature review, focused on technologies in accounting education and business simulations. The second part is focused on the methodology, describing its goals and methods of data collection. The case study is described in the third part, analysing the course response to the new needs of the accounting profession, based on the discussed results of the interviews with students and teachers. The fourth and last part presents the conclusions and limitations of this study and also suggestions for future research.

LITERATURE REVIEW

TECHNOLOGY IN ACCOUNTING EDUCATION

The accounting education evolved to fulfil business requirements, better prepare students for market requests (Yap, Ryan, and Yong 2014) and to thrive in a changing environment (Byrne, Flood, and Willis 2002).

The modern organizational environment requires professional to develop new skills which schools should foresee to train their students to do. Skills should include the ability to research a wide variety of sources like web searches and to work with a wide range of data services (Albrecht and Sack 2000).

In a Yu study (Yu, Churyk, and Chang 2013) alumni's were the first to recognize their limitations as they felt badly prepared in the use of database, oral communication, technology domain and problem solving.

Accountant professionals must research and work with a large amount of (disorganized) information therefore students should be active participants in the learning process, learning by doing, working in groups and being able to locate, acquire and organize information (AECC 1990). The increasingly dynamic environment in which accountants work, required a reorientation in teaching accounting. Nowadays it is difficult to do accounting without the use of specific software. In graduate courses it is required a first contact with professional technologies such as ERPs (Enterprise Resource Planning), so students develop their confidence and capacity to use of these tools in the real world.

The newest generations of students are better familiarized with technologies – they learn to deal with mobile phones, tablets and personal computers from an early age. Therefore, we must take advantage of these valences to implement incremental changes to develop some of their strengths such as teamwork, motivation, allowing them to make the difference in organizations, developing communication with supervisors, and ease with technology (Mastrolia and Willits 2013).

In order to address these weaknesses and solidify skills and attitudes, teaching based on business simulations arises supported by a problem based on learning pedagogy. Methodologies of teaching/learning inherently practical arise, based on the simulation business/enterprise, in which the students experience organizations real situations and are able to train broader skills.

BUSINESS SIMULATION

Business education based on simulations arose in the 1950's (Gredler 2004) in which students worked in a high complex environment very similar to real life business. The characteristics of a simulation are: participants interact with a complexity of situations similar to business reality; with clear rules, responsibilities and limitations defined by the teachers allowing the participation of students; several strategies can be implemented in environment data (such as leadership); and students receive feedback on actions taken (Gredler 2004).

This simulation learning model has four phases: the first phase is expository, involves the teacher presentation of the topics and contents to be discussed. In the second phase, teacher explains the rules, procedures, evaluation methods, targets and types of decisions required. The third phase describes the participation of students in the simulation. Finally, phase four involves feedback, the students analyse the process and what went wrong, comparing the learning experience with real life and making connections with content from other courses since it is a multidisciplinary learning process (Joyce, Calhoun, and Hopkins 2009).

This teaching process also known as a facilitator (Keskitalo, Ruokamo, and Väisänen 2010), helps students in the transition to the professional world. The teacher is no longer a player of ideas, but leads the students in a training process with autonomy that demands more critical

and creative capacity. Studying is a workout, since students are trained to course skills and knowledge.

The simulations are created on a problem based learning pedagogy, characterized by simulating real situations adapted in order to develop learning. This pedagogy highlights the importance of questioning allowing students to select and filter the essential information for decision making. This competence is underdeveloped in accounting education but it is crucial in order to be successful. The students work as a team during the semester just like entrepreneurs who constantly meet to solve real-world accounting problems. (Ed, Stanley, and Marsden 2012).

This pedagogy is based on Learning Theory of Constructivism. According to this theory the students build their own knowledge instead of being transmitted by the teacher (Biggs 1996). Students learn by choosing and develop their knowledge through individual and social activities. Knowledge is built not acquired (Phillips 2000). In problem based learning pedagogy, the learning process is driven by real-world problems, unstructured and is an active-learning and learner-centered approach. This learning environment is based on constructivism in which real problems are used in the learning process (Tan 2004).

RESEARCH METHODOLOGY

This qualitative study is based on an interpretative paradigm and follows a descriptive case study (Ryan, Scapens, and Theobald 2002).

We studied the courses of Business Simulation Project created in 2003, in the School of Accounting and Administration of Porto, Portugal. These courses are based on accounting education, centered on IT and aim to solve problems similar to real world.

The study was conducted by researchers (one teacher and three assistants) that are part of the courses team, as knowledgeable and experienced in this process. Our study reports to two semesters: second semester of 2014/2015 (February-July) and first semester of 2015/2016 (September-January).

The purpose of the research is, in one hand, to understand how students face new technologies and the complexity of business tasks and on the other hand, understand if they feel prepared and confident for the labour market.

Accordingly, we formulated the following research questions: How does accounting education embrace new technologies, to face new requirements of accounting profession? How are the technologies used in the courses of Business Simulation Project, perceived by the students and teachers?

The sources of data used were empirical observation (document analysis, direct observation), informal conversations and interviews (Mckinnon 1998). To ensure the credibility and control

the subjectivity of researchers, the interviews were recorded and a triangulation was made between this information and other sources (particularly with empirical observation) (Yin 1994). Observed behaviours of students in class and on schedule meetings, exchanged emails with the teachers and with the course support office were analysed for data collection. These data were recorded in journals throughout the semesters. Information was also collected from the semester surveys to students, video presentations of student's work, PowerPoint's and other support classes' documents. Informal conversations with students who completed the course in the second semester of 2014/2015 and begun their professional activity in the same year (2015) were registered. Information was also gathered from teachers and assistants' weekly meetings, from informal conversions, minutes and exchanged emails.

The six interviews took place between September 2015 and January 2016. People with adequate profile were interviewed: the course director, a teacher, IT technician, three students (one who completed the course and other two finishing it).

In the final phase the collected data were interpreted and discussed.

FINDINGS AND DISCUSSION

How does accounting education embrace new technologies, to face new requirements of accounting profession?

The School of Accounting and Administration of Porto developed in 2003 a project that differentiates the school in accounting education. The project did allow the creation of two courses of Business Simulation Project based on new methods of teaching/learning and assessment.

The project aims to familiarize students with the new information technologies, through the use of modern information management tools, under a complex and systemic business simulation. The courses were introduced in the graduation of Accounting and Administration, taking place during two semesters, with a workload of 180 hours, a total amount of 438 students and 18 classes. It follows the quality standards, having a certificate based on the Technical Specification ET SC-EDUC-27 since 2003. The motto is "know-how" and "learn to learn". Its purpose is to give a practical overview of professional activity, facilitate the transition to the labour market and to respond to the needs of organizations strengthening students' skills and building professional, personal and ethical attitudes.

These courses aim at preparing professionals by providing them with new skills such as the ability to structure, search and reorganize information in an integrated environment, teamwork, decision-making and the ability to communicate.

Students (organized in groups of three) create and manage virtual organizations, interacting in real-time. For that two kinds of information technologies are used: educational (technology-based assessment and simulation support technology) and entrepreneurial (ERP and a complementary system).

The educational tools developed for the course include a technology-based assessment and simulation support technology. The technology-based assessment allows continuous feedback (monitored by the teacher during the semester). It contains programs such as assessment of physical dossiers; program to compare the expected results with the effective tasks performed, a global report of session's assessment containing attendance, ethical attitudes, oral presentation of the final report, written tests and final report classification. The simulation support technology includes managerial environment program such as classes' guidelines reports, business plans, tasks details, summaries and layout of the classrooms with direct interaction (allowing identification of the students in classroom, the virtual organizations, the attendance, and the behaviour record).

The entrepreneurial technology includes information technologies and ERP identical to some medium/large companies. There is also a complementary system to simulate scenarios similar to real life (such as bank and government transactions). The programs involved are: entities, creation of documents, management information and multimedia, exchanges, salaries, accounting, invoicing, payments, electronic commerce, bills of credit, fixed assets, maintenance, management material products, production, management panel, management of the system, computer telephony integration (in the ERP) and in complementary system: electronic bank and government/taxes.

There are also two simulation laboratories, one room for support team and a room for servers. In order to support this environment it was necessary to create a technological structure especially built for this purpose. This included five servers: one for the Oracle© database, another to support the remote desktop access, other as a domain and communications server, other as domain server and to control electronically the assiduity and punctuality, by the use of a personal card and the last one for Business Intelligence (BI) and Balanced Scorecard (BSC).

The communications systems were especially conceived for Business Simulation Project and had to be especially configured by Siemens© in order to provide internal faxes and computer telephony integration. This was at the time innovative and remains so. For computer telephony integration to work out a complex structure was created, attaching automatically a telephone extension number to the virtual organization logged on. This extension number matches with the number of virtual organization.

Students work in simulation laboratories with the physical and logical materials to allow multiuser company operation. Each laboratory contains thirty-one computers, sixteen printers,

fifteen scanner, fifteen handheld bar code scanners and sixteen telephones, among other material. It's also possible to use a remote desktop to consult support documents, assessment feedback, evaluate company database and extract reports.

To support them, there is a team with teachers (six teachers) and a support team (four assistants and two IT technicians). The support team is responsible, under guidance, for maintaining virtual organizations. For that they have to prepare databases (ERP), treat documents information (invoices, contracts...), manage electronic banking, manage technology-based assessment, create business plans, prepare hand-outs to support classwork, maintain servers and other hardware.

Weekly planning meetings are necessary to align all the team and ensure that classes run normally. Teachers are responsible for the lectures, guiding students throughout the tasks, control the participation of the students in the business simulation system, give feedback through the assessment framework and follow-up after classes when necessary.

The course structure is demanding, with a huge amount of equipment and software to manage and with a big support team. Despite all of this, the structure is considered adequate to the accounting education. The initial investments made paid off, since some companies recruit students with the requisite of having attended the course.

The interaction between virtual organizations creates a large amount of information, with legal deadlines and obligations, with the same working pressure as in real business life. Sometimes some information purposely will be insufficient or incongruous in order to generate confusion and cause internal discussion.

The environment is very complex to manage, with large amount of unstructured information, phenomenological versatility, real-time management and intense interaction.

How are the technologies used in the courses of Business Simulation Project, perceived by the students and teachers?

This business simulation model, according to students, is appropriate to the objectives of the course and functional: consisting of seven virtual organizations, a group of three students, one teacher and one assistant by laboratory. The standard certificate of the courses is reliable and permits the accomplishment of the proposed objectives.

The atmosphere in the classroom is very professional, allowing students to preview how real organizations work. In this way they recognize the importance of developing several tasks including obligations regarding to VAT (value added tax); processing, paying and legal obligation of salaries; amongst others. The remote desktop is very useful as it allows them to analyse permanently the information produced by tasks performed all over the semester.

The IT's used, as similar to the real world as possible, are recognized as a good framework to prepare them to the professional future.

For teachers, this teaching/learning model allows participation in a simulated environment with the ability to cover different situations, leading to competent decision making in some functional areas of business. It is therefore recognized the requirement to encourage interaction with other courses due to it multidisciplinary. This motivation model facilitates the articulation between the coordinators of all graduation courses. The students face an interactive process with teachers and assistants receiving constant feedback of their work. The teacher is a facilitator, using models that range from the expositive to the practical models, where concepts and theories are applied increasing and improving the interaction with students. This interaction makes education a constant challenge.

CONCLUSION

Nowadays efficiency is a key factor in the business world. Information needs to be relevant and timely used to support decision-making capacity. Schools had to adapt and create new models of learning and teaching. The presented model of business simulation is supported by two kinds of information technologies: educational and entrepreneurial. This model prepares students for the real world since it uses complex and modern technologies, automated procedures, integrates different tasks and permanent information with remote control.

Students recognize reliability in the business simulation model proposed. Standard certificate and complexity of tasks are extremely positive aspects, which give them confidence to face business reality. The support technologies are a strength factor approaching the model to real professional life. The relevance of the model grants graduates' students to succeed in the labour market as the cases and technologies learnt are similar to those in use by professional accountants.

The team of teachers, essentially experts beside academics, recognize the efficiency and effectiveness of the model, in educating future professionals and enhancing the use of technologies to strengthen the acquisition of knowledge. Teachers are confronted with a motivating and interactive method, although time consuming, particularly on the assessment level.

One of the limitations of our research is the fact that the authors are part of the case studied as they integrate the team of business simulation. There was a concern to triangulate

information with all sources (document analysis, direct observation, informal conversations and interviews), in an attempt to decrease the observational bias error.

For future research we suggest comparative case studies that would help to better understand how other national or international schools provide answers to accounting education and if simpler models can be as effective.

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