The Use of Information Systems to Educate Accounting Students

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Abstract - This paper provides evidence about the use of information systems to educate students from the accounting and administration degree of ISCAP – School of Accounting and Administration of Polytechnic Institute of Porto. Students recognize the importance and value of the new methodology used to teach Business Simulation (BS). A discussion about the improvements that can be made in the disciplines, considering contemporary literature in accounting education is provided. The case study also helps to clarify what is the level of satisfaction of some stakeholders.

Keywords – Business Simulation; Accounting Education; Learning by doing; Accountants' skills; Information systems

1. INTRODUCTION

In recent years there have been a lot of changes in accounting education. As the result of fast technological advances and market globalization, the role of today's accountants has shifted from a simple bookkeeper to a provider and "translator" of diverse information to different users (AIPCA, 2006). These changes incited the need of accounting professionals being prepared with skills that were unnecessary in the past. To deal with this situation, research has been made, especially in order to provide insights about the way accounting students should be prepared for their profession (Adler and Milne, 1997; Meyer and Eley, 1999; Fiet, 2000; Duff, 2004; Lin, Xiong et al., 2005). As a consequence learning-by-doing or action-based approach has been used in several higher education institutions all over the world (Adler and Milne, 1997; Kinsella and McBrierty, 1997; Hughes and Berry, 2000; Fiet, 2001; Silva and Lopes, 2004). Adler and Milne (1997) do not understand why new pedagogies to promote organizational, interpersonal, and communication skills are not implemented in practice, as they have a lot of benefits in students. In their findings, the authors conclude that students agree with the use of action-oriented learning tasks in order to provide them the needed attitudes, skills, and knowledge (Adler and Milne, 1997). Adler and Milne (1997) pointed out two problems that had been visible in several reports from various accounting professions and agencies: i) accounting educators were not capable of dealing with a broader knowledge base, and ii) students were not capable of developing fundamental capacities, as communication, problem solving, or interpersonal skills.

This paper presents an example, which uses actionoriented learning tasks with the objective of helping students to develop attitudes, skills, and knowledge which helps to solve Adler and Milne (1997) pointed problems.

The paper is organized as follows. In the next section, some contemporary literature review in accounting education is presented. Section 3 provides information about research method and data collection. The following section presents the case study. Section 4 presents the general results and a discussion about the case study. The final section contains conclusions and suggestions for further research.

2. LITERATURE REVIEW

Important competencies for an accountant were identified by American Institute of Certified Public Accountants -AIPCA (AIPCA, 2006). AIPCA (2006) defines six functional competencies that are aligned with what the accountant profile should be. The first competency is decision modeling. For AIPCA, accounting professionals must be prepared to use a critical and strategic way of thinking in decision-making issue. The second functional competency suggested is risk analysis, as it is very important to avoid frauds and other inadvertent errors. The third competency proposed by AIPCA is measurement, as accounting professionals must be prepared to assess organizations' performance, both qualitatively and quantitatively. The fourth competency suggested by AIPCA is reporting. This is one of the most important ways of communication used by accounting professionals, as that communication can be very useful for the decision maker. The fifth competency is research, as the changing

environment in the business world does not let other alternatives. The sixth and last functional competency proposed by AIPCA is leverage technology to develop and enhance the other functional competencies. The capacity to use efficiently and effectively information and communication technologies is essential in order to develop the other functional competencies.

Others researchers identified other important skills that accountants should have. In China, Lin et al. (2005) have made research about the perceptions of accounting practitioners, teachers, and students on the required knowledge, skills, and pedagogy for accounting education. The authors concluded that accounting practitioners emphasize education of written and oral communication skills, a relatively weak area that should be strengthened in Chinese accounting education (Lin, Xiong et al., 2005). In the same vein, Ellis (2006) values writing skills as one of the most important ways to communicate. The researcher considers that a better understanding of what students learn is connected with a further approach in writing (Ellis, 2006).

Team work is another important competency that accounting professionals must have. Luthje and Prugl (2006) explore the role of team work among students with different backgrounds. In spite of the fact that prior studies had shown some relational problems among people from other disciplines, they demonstrated that their course experience provided an attitudinal beliefs' change among students (Luthje and Prugl, 2006). The main reason presented for that change was communication, as the more students shared experiences with each other and the more they familiarize themselves, the stronger these effects became (Luthje and Prugl, 2006). In the same stream, Prichard et al. (2006) investigated the effects of team-skill training on collaborative learning at an university level and concluded that team-skill training facilitates teamwork on a collaborative learning task. As investigated by Scofield, selecting unstructured cases for a team approach can create pedagogical benefits, i. e., students can improve their learning of accounting and their teamwork skills (Scofield, 2005).

The use of new information and communication technologies changed the way we live today, especially how an organization works. The need of a decision support system in management is very important (Baupin and Zreik, 2000). Technological advances require that accounting professionals have skills to obtain information from several sources, manage computer-based projects, and utilise computers as the main tool of their work. Several authors called for more research in accounting education with a technological basis (Rebele, Apostolou et al., 1998; Apostolou, Watson et al., 2001; Watson, Apostolou et al., 2003). Some responses were given (Larres and Radcliffe, 2000; Bhattacharjee and Shaw, 2001; Lane and Porch, 2002; Stanley and Edwards, 2005; Carayannis, Popescu et al., 2006; Freitas and Oliver, 2006; Markett, Sánchez et al., 2006; Patten, Sánchez et al., 2006; Potter and Johnston, 2006). In UK, Larres and Radcliffe (2000) analyze the level of effectiveness in promoting student learning through computer-based instruction. They conclude that technological tools are valued by students in order to achieving educational results, and as a preparation for lifelong learning. However, it was not possible to conclude that this methodology was more effective than traditional ones. In the USA, Bhattacharjee and Shaw (2001) analyzed the effects of using a project that was designed to concurrently develop students' computer-based skills and improve their perceptions towards technology. The authors found that the project enhanced students' technological skills. Other study was done in UK to examine the impact of computer-aided learning (CAL) on the performance of nonspecialist accounting undergraduates (Lane and Porch, 2002). The results illustrate that the project enhanced students' Internet knowledge and skills to access information on a technological basis. Stanley and Edwards (2005) developed a CD ROM to assist students in their accounting learning and concluded that students were receptive to learning in online environments, which are properly designed and built. Carayannis et al. (2006) explore how technological learning and information and communication technologies (ICT) may influence the development of entrepreneurs in the Knowledge Economy. They conclude that technological learning and ICT act as important means of knowledge creation, dissemination and utilization in the process of economic development (Carayannis, Popescu et al., 2006).

Freitas and Oliver (2006) propose a four-dimensional framework for helping educators to assess the potential of using games- and simulation- based learning in their practice. The four dimensions are: i) the context where learning takes place; ii) attributes of the learner, like age, learning background; iii) the internal representational world; and iv) processes of learning (Freitas and Oliver, 2006). Patten, et al. (2006) explore the role of handheld devices in the way people learn. They conclude that mobile phones and other handheld devices will have a strong influence in learning in the future (Patten, Sánchez et al., 2006). In the same vein, Markell, et al. (2006) explore the use of SMS (Short Message Service) by students' mobile phones with educational proposes in a classroom. The result was a higher level of interactivity that brought some advantages to learning, such as, a more active learning environment, greater and ongoing feedback for educator, and increasing in student interest and motivation (Markett, Sánchez et al., 2006). There seems to be a positive effect on students' performance by using technologic-based education tools. Potter and Johnston (2006) explored the association between undergraduate accounting students' use of an on-line learning system and the learning outcomes achieved by those students. The results demonstrated that the use of the learning system by students has a positive influence on their learning results (Potter and Johnston, 2006). The use of technologies in order to improve students' learning is something that educators have kept in mind.

An entrepreneurial attitude is very important for an professional. Some accounting studies about entrepreneurship in accounting and business education have been done. In 1997, a study to rank university entrepreneurship programs was conducted in the United States (Vesper and Gartner, 1997). The researchers conclude the study using the education criteria from the Malcolm Baldrige National Quality Program to measure progress in entrepreneurship education (Vesper and Gartner, 1997). In the US, an entrepreneurial leadership course, that was created in 2001, has been improved in each successive semester it is offered (Okudan and Rzasa, 2006). In their findings, Okudan and Rzasa (2006) conclude that these improvements make the course a success. In Canada, entrepreneurial education is not new. McMullan and Gillin (1998) discussed the implementation of a graduate-level degree programme design and the results about surveys conducted. In Ireland, a study that provided evidences of pioneer technological entrepreneurialism within the higher education was conducted (Kinsella and McBrierty, 1997). The authors identified knowledge equity as the basis of competitive advantage of industry, and of countries (Kinsella and McBrierty, 1997). Rasmussen and Sorheim (2006) demonstrate, in their findings, that entrepreneurship education in Sweden is changing from a traditional focused on teaching individuals to on learning-by-doing activities.

Some researchers explore other different ways of accounting education. Duff (2004) proposes ways accounting educators can make use of Cognitive Learning Styles (CLS), develops associated measures to help students 'learn how to learn'. The author concludes that CLS literature has not been used efficiently, and there have been no efforts to apply it in a concerted way within accounting education (Duff, 2004). Additionally, to help students 'learn to learn' Duff (2004) suggests accounting educators to use both cognitive information processing (CIP) and student approaches to learning (SAL) paradigms. While CIP paradigm helps accounting educators to understand how the learner organizes and processes information, the SAL paradigm takes into consideration the difference between the quality of learning outcomes and academic grades (Duff, 2004). Fiet (2000) defends that theory-based activities can be very powerful within a class, for example to stimulate students to apply their knowledge in an innovative way. Students can be on the alert for a special promoted activity. Some advantages of using theory-based activities are: i) they keep away from monotony by inviting student to play a role in the learning environment; ii) it is easier to enroll all the class in the learning process (Fiet, 2000). Fiet (2000) pointed out some obstacles to using theory-based activities. The first one is a question of mentality; it is very difficult to change from a traditional way to a theory-based activities form for those educators that need to exercise their professional control. Another problem to the use of theory-based activities is that requires a lot of time to prepare classes, especially because educators are not compensated for that (Fiet, 2000).

On the other hand, some authors defend that university accounting educators should have a different role in their profession (Craig and Amernic, 2002). Craig and Amernic (2002) consider that accounting educators should emphasize more social issues in their classes. In studying education methodologies in other areas, such as mathematics, some authors support that the approach to learning may differ between subjects (Meyer and Eley, 1999). Although accounting professionals should acquire important competencies and skills to be prepared to perform at the best way, those qualifications may not be sufficient. The continuous changes in several areas require an "up-to-date" professional. Lifelong learning is a habit that must be addressed by accounting professionals. Some studies have been done about this issue. Candy (1995) defends lifelong learning as one of the main important pillars in undergraduate programs. He stated that universities that focus on developing lifelong learners, perform their role at the best way (Candy, 1995).

In Europe, lifelong learning has an important role. An European Commission report shows which are the resources dedicated to lifelong learning in order to provide new and better policies about this issue and assess their efficiency and effectiveness (European Comission, 2004). In Portugal, research about lifelong learning deserves an important interest. A background report explores how national qualifications systems can promote lifelong learning (OECD, Ministério da Educação et al., 2004). Lifelong learning cannot be apart of technology. Larres and Radcliffe (2000) conclude that students are better prepared for lifelong learning if they know how to use technological tools.

In order to provide the needed feedback to students, assessment systems should be different from the traditional ones. In a recent position paper about the state-of-art of education assessment, Birenbaum et al. (2006) support the need of changing the traditional assessment system used not for learning but only as an assessment instrument of learning. These authors defend a paradigm shift from Assessment of Leaning towards Assessment for Learning (Birenbaum, Breuer et al., 2006). Birenbaum et al. (2006) propose an Integrated Assessment System to overcome the problems of the traditional assessment systems. Therefore, that system should integrate both new and old ways of assessment, offer other new ways on test validity, develop new methodologies, include both formative and summative assessment forms, and be cost-effective (Birenbaum, Breuer et al., 2006).

Although there had been several examples of research in educational areas, contributing into practice within teaching community, Lucas and Mladenovic (2004) stated that there is a need for research in a large number of areas within accounting education. As supported by several researchers, the view of learning results and perspectives to learning may differ accordingly with disciplines (Lucas and Mladenovic, 2004). Their study is a response to that need, especially because it presents a new approach to learning and the assessment of learning outcomes is new (Lucas and Mladenovic, 2004). All higher education institutions have an important role to perform. A changing paradigm is coming, as the higher education institution cannot be static and away from the rest of the world. Some authors defend the use of a triple helix model to a better contribution from all institutions that take part of the model. Marques et al. (2006) have researched, in a case study base, the interaction between university-industry-government, with specific reference on the University of Coimbra, Portugal. The triple helix model is conceptualized by Etzlowitz and Leydesdorff (Etzkowitz and Leydesdorff, 2000) in a way that exist a spiral pattern or relations and links between the three institutional actors: Industry, University, and Government, in which the university can play an important role in the context of a knowledge-base economy.

3. RESEARCH METHOD AND DATA COLLECTION

The chosen method of investigation was the case study. Yin (1994, pag. 13) defines a case study as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident". This methodology is used in many different situations, such as political science, community psychology, organizational and management studies, the conduct of dissertations and theses in the social sciences, etc. (Yin, 1994).

There are several different classifications of case studies. Yin (1993) divides case studies into exploratory, descriptive, or explanatory. Moreover, research can be based on single or multiple-case studies, which means that can exist six different types of case studies (Yin, 1993). An exploratory case study aims at constructing questions and hypotheses of a consequent study. A descriptive case study shows a full description of an experience within its context. An explanatory case study illustrates which causes produces the observed effects (Yin, 1993). Several authors have used this methodology in higher education research (see, for example, (McMullan and Gillin, 1998; Rasmussen and Sorheim, 2006).

As each research strategy can be utilized for all three purposes of investigation, i. e., exploratory, descriptive, or explanatory (Yin, 1993), the choice for this type of research strategy took into account the three conditions exposed by Yin (1994). The first condition is about the type of research question created. The second is about the control researcher has over behavioral events. And the last condition is about the center of attention on present as contrasting to past events. This study is focalized on contemporary events and the type of questions more appropriated for a case study are 'how' and 'why' (Yin, 1994).

The basis for this investigation is the case of BS disciplines. The access to information about the research was completely free. The researcher had the opportunity to collect some contributes from all the staff involved in BS environment, namely the coordinator, teachers, and administrative staff. Besides the literature review, other information sources were used, such as internal and official documents from ISCAP (ISCAP, 2004; ISCAP, 2005), and documents from external entities (SGS, 2003). These research procedures, which can be considered as triangulation (Yin, 1994; Modell, 2005) intend to provide a more valid and reliable data.

This study can be considered as exploratory, because it aims to have some insights about the use of new methodologies in accounting education.

4. CASE PRESENTATION

Background

Polytecnic Institute of Porto – School of Accounting, known as ISCAP (*Instituto Superior de Contabilidade e Administração do Porto*) is one of the biggest Portuguese schools in accounting. ISCAP is more than a hundred years old and has about five thousand students. Although ISCAP provided five different graduate degrees, the majority of students are enrolled in accounting degree. The case that will be presented shows how two disciplines have changed ISCAP accounting degree.

In February 2003, two Business Simulation (BS) disciplines were introduced in the accounting and administration degree in ISCAP. This change occurred because the context was peculiar. First, future accounting professionals need to learn more than only theoretical concepts. AIPCA (2006) suggests six functional competencies for an accounting professional. Second, the accounting education had been orientated to basic competencies that do not have a sufficient value for the accounting concepts that were taught had no practical use. In the same stream of other higher education institutions, ISCAP has changed the way of accounting and business were taught.

It was necessary to buy a lot of material resources, especially hardware and software. Two classrooms were totally equipped with computers, printers, scanners, telephones, and other equipment. The other rooms, needed for administrative purposes, were also equipped with hardware and software. Integrated management system software and a relational database were provided in order to provide an extent network environment. In the very beginning it was necessary to have a lot of human resources, as the project initiate with more than a thousand students. Since the beginning of the project, companies have an important role as sponsors. There is a partnership between ISCAP and external entities in the project. ISCAP has been performing the new role of a higher education institution as defended by Etskowitz and Leydesdorff (2000).

Objectives

The main objective of the BS disciplines is to overcome the deficiencies of traditional education, giving a practical view of the professional activity and preparing students for the real business world. This objective is consistent with some studies that defend the action-based learning (Adler and Milne, 1997; Fiet, 2001). Other objective of BS disciplines is to enable students to apply their knowledge previously obtained in other disciplines. Actually, there have been some difficulties, because the graduation programme was not totally prepared to facilitate that purpose.

This new methodology of education allowed students have to know, not only traditional and theoretical concepts, but also how to apply them in a practical situation. Moreover, students must be prepared for a lifelong learning during their professional careers. The use of an integrated management information system by students prepares them for the highest-level business and management careers.

Resources

In the beginning, seventeen teachers, and administrative and technical staff were needed, as the number of students was extremely high (more than a thousand). After the first semester the number of teachers was reduced. Teachers' background is mainly in management and accounting areas. The teachers' role in a classroom is essentially to explain and support students' activities. All activities are planned and prepared for students with two classes in advance. Additionally, some administrative tasks are done by teachers, such as, preparing the environment, providing some special services (banks, insurance companies, public administration, etc.) to students' companies. Administrative and technical staff maintains operational the whole system. In terms of material resources used, there are two classrooms with a maximum capacity of sixty students each, a planning and an administrative room. The classrooms are used only for classes. The planning room is used for teachers work and for planning meetings. The administrative room is divided in two; one for computer servers and all the needed material to put the system running, and the other for students. Students are allowed to practice and train in the information system, whenever they want in order to improve their performance in classrooms.

BS Environment

With the advances of technology, the problems of information scarcity and information access have diminished a lot. For an accounting professional is very important to know which the relevant information is. That could not be an easy task, if the right tools were not used. In addition to several important competencies an accounting professional should have the right information systems to manage all information. Consequently, the accountants' role is more and more important for the organizations, as their work has a widen perspective. The decision making process and the knowledge of how the company works are some examples of a new accounting professional's activities.

The BS disciplines aim at alerting students that all of these changes (in the world, and consequently in the accountant's role) are not a future trend but a fact of the present. Therefore, to stimulate lifelong learning, students are requested to read and analyze business magazines and newspapers and to make some comments about the possible consequences on their companies. Additionally, students have to apply their broadened knowledge in BS disciplines. The first example is the starting process of a company, which allows students to apply law concepts. Other activities' examples are inventory management, human resources management, financial management, and information systems management. All these activities are possible without any risk, as students perform in a "protected" or risk-free environment.

In a classroom there are several groups of students. Each group has three or four elements that represent a company. This procedure intents to provide a teamwork skill, as defended by other authors (Prichard, Stratford et al., 2006). All students' companies perform their activity in a risk-free environment, which means there are no professional consequences of doing something wrong. The companies have to do exactly what a real company does, especially concerning with deadlines. All real events that have a deadline, such as, taxes and salaries' payment, must be accomplished by students' companies. Each students' company has a different activity, providing a diversified market. Other special entities, such as, associations, insurance companies, banks, rental companies, public administration, leasing and factoring companies, etc., are managed by teachers (ISCAP, 2005).

Students' companies are the main entities of the environment, as they are the focus of the new methodology. They cooperate and compete among themselves. All tasks done by students will provide substantial volume of information for decision-making process. In spite of the fact that students have a plan with some predictive costs and profits, there are some decisions they have to make. For example, some questions like 'which is the product's quantity to order?', 'what to do if there is too much, or too less money in the bank account?' should be responded by students.

Students write a report about company's performance during the semester and present it orally in an audience, in the end of the semester. Moreover, in BS disciplines, students are invited to write frequently some comments about the news. Both languages, Portuguese and English, are used in this task. Students' companies have a quality orientation in order to be certified by ISO 9001-2000 standards. As the real world can provide some uncertainty, some tasks are done under pressure.

There are some restrictive rules that must be respected by all students' companies. These rules allow the interactivity of the system, allowing companies interact with each other (ISCAP, 2005).

Assessment System

The BS disciplines' assessment system is very different from the other disciplines of ISCAP. As a consequence, the number of classes must be the same each semester, and nothing must change that. If something happens and a teacher cannot be present in a specified date, another teacher will substitute him/her. BS disciplines have a special regulations document (ISCAP, 2005), in which is defined the assessment system. The assessment system has a group evaluation component of 65%, and an individual evaluation part of 35% (ISCAP, 2004). Group evaluation is divided into continuous evaluation, and punctual evaluation. Continuous evaluation consists in classes' assessment, and punctual evaluation encloses assessment of physical files and of the final report. Individual evaluation takes into account participation, behavior and the report's oral presentation (ISCAP, 2004). All these assessment procedures are done by teachers using the help of an information system. Table 1 presents the assessment system's components.

Table 1. Business Simulation Assessment System's Components

Description	0-100 scale
Continuous Evaluation	48,75%
Punctual Evaluation (Files)	9,75%
Punctual Evaluation (Report	6,50%
Behavior	10,50%
Participation	10,50%
Oral report's presentation	14,00%
TOTAL	100,00%

Source: Silva, P. L. and I. Vieira (2006). A Utilização dos Sistemas de Informação nas Metodologias de Avaliação no Ensino Superior. <u>XVI</u> <u>Jornadas Luso-Espanholas de Gestão Científica</u>. Évora, Portugal.

Quality certification and external recognition

BS disciplines were the first higher institution disciplines that introduced quality certification, in Europe. This argument was made by the coordinator of BS disciplines. The quality issues were introduced since the very beginning, as the disciplines were certified for the first time in July 2003. Since that time, SGS (Société Générale de Surveillance S.A) makes two audits every year in order to verify if all certified characteristics continue wellimplemented (SGS, 2003). Additionally, at the end of each semester students respond to a questionnaire, in which they give their opinion about BS organization and teachers, in several different items. Since the very beginning, students' opinion about teachers and about organization and planning of BS disciplines is very positive, as shown by the coordinator.

There are some examples of recognizing the value of this innovative approach. First, in the beginning of the project, the Minister of higher education has visited ISCAP. Second, there were two other higher education institutions that were using the same environment; one is from Lisbon, Portugal, the other from Maputo, Mozambique. Regularly external entities visit ISCAP with the objective to know BS environment. The majority of visitors are companies' directors, which give very positive feedback. ISCAP has also received visitors from France, Poland, Spain, Czech Republic, Slovakia, Finland, Angola, Mozambique, among other countries. Many of them are teachers and researchers from higher education institutions. The opinion from them is also very positive, as stated by the coordinator of BS disciplines.

5. RESULTS AND DISCUSSION

This study has revealed interesting aspects about accounting education. First, there are more and more innovative teaching methodologies in higher education. Second, an accounting professional should be prepared not only with theoretical structure, but also with a number of competencies, as the world changes rapidly. Third, Portugal is considered the last in several issues among the EU countries. In higher education, especially in accounting area, there seems to be a good example of innovation. Fourth, the Bologna process appeals to a paradigm shift in education, especially in the way teachers and students perform their role. Students are accountable for their curriculum and teacher must help students as a tutor. As demonstrated previously, in BS disciplines students' responsibility is high, and teachers are continuously present to help students to overcome any difficulty during and after classes. Fifth, the use of new technologies in higher education is far from being generalized. Students

perceptions about that use is very positive (see, for example, (Potter and Johnston, 2006). The case provided an illustrative example of how high technology is used to serve students education.

In order to give some insights in higher accounting education, three research questions are presented: 1) What are the characteristics of BS disciplines from ISCAP?; 2) Are these characteristics consistent? Is there any opportunity to improve the existing characteristics, according to recent investigation?; 3) What is the satisfaction level of several stakeholders (students, teachers, administrative staff, directive board of ISCAP, Government)?

The first question is easily responded, as the case description explains exhaustively the characteristics of BS disciplines. The second question is important to respond in order to know if any improvements are possible to do. Some of the characteristics of BS disciplines are consistent with literature. As reviewed in contemporary literature, there are some important competencies that must be provided to students in higher education. It is possible to identify some important skills an accounting professional must have. First, an accountant must be prepared with all functional competencies (AIPCA, 2006), such as, decision modeling, risk analysis, measurement, reporting, research, and efficient use of technologies. In addition, and as identified in literature review, accounting professionals must have other important skills, such as, entrepreneurial attitude, written and oral communication skills, teamwork, and a lifelong learning attitude. BS disciplines provide some of these skills. Some of the activities, such reports, or comments provide the development of written and oral communication, but that may not be sufficient, as students communicate orally just once, in the final of the semester. Team work is one of the clearest characteristics of BS. As students are divided into groups of three or four, they have to work as a team. Moreover, the assessment system gives an important value to group work. Although BS disciplines are from an accounting degree, students experiment the need of being "up-to-date", as external environment is changing continuously. However, this message may be reinforced during the classes, in order to prepare better students for the future. There is a final point, which could be better developed, that is entrepreneurial attitude. Students manage their own company during classes, and consequently, are being accountable for their performance. In spite of this, several limitations in management are provided in order to put the simulation environment under control. Consequently, students do not develop an entrepreneurial attitude for the long-run.

Other characteristics of BS disciplines must be presented. A strength that can be presented is the use of high technologies to help teachers assess students (Silva and Vieira, 2006). Furthermore, a continuous assessment is provided, that goes towards the researchers' appeals in order to create learning integrated assessment systems that focus assessment for learning, not assessment of learning (Birenbaum, Breuer et al., 2006). Another strength is quality certification, as presented by previously researched literature (Vesper and Gartner, 1997).

The third question cannot be responded totally, which can be considered a limitation of this study. From the description of the case study, there seems to be clear that BS disciplines have an important impact among other international higher education institutions and among Portuguese companies. Additionally, the visit of a Minister can be considered also recognition from the Government. In general, it seems that teachers have positive opinion about BS, but no survey study was done to demonstrate that. As exposed by the coordinator, and as revealed in questionnaires, students, in general, have a very good opinion about the disciplines and about teachers. Although, students' perceptions is a research issue that should be further investigated. Other research strategies, such as, surveys can be taken into account to assure validity and reliability of the study. No opinion from ISCAP directive board was collected, which means that this is one of the most important limitations of the study. However, as BS disciplines have functioned during the last three years, it can be interpreted that no big problem is there.

6. CONCLUSION

This paper provides evidence that BS disciplines have important strengths in higher education methodologies. First, they provide important skills, such as team work (Scofield, 2005; Prichard, Stratford et al., 2006), written and oral communication (Lin, Xiong et al., 2005; Ellis, 2006), use of technologies (Larres and Radcliffe, 2000; Potter and Johnston, 2006). Second, they provide some of the needed competencies for an accountant (AIPCA, 2006). Third, they have an innovative assessment system, supported basically by information systems. The use of a such assessment system goes towards some recent investigation approaches that defend assessment, not only of learning, but essentially, for learning (Birenbaum, Breuer et al., 2006).

The use of several different sources of information provided a more realistic description of the case. The investigation was based in a three-year period, which can be considered sufficient time for an investigation like this. It was possible to identify strengths and weaknesses of BS disciplines. In spite of the fact that no survey was conducted some of the stakeholders' opinions were easily gathered by the researcher in an informal way.

This study has also some limitations that must be identified. It does not provide a quantitative analysis about perceptions of stakeholders, especially students. It only provides a general opinion based on some internal questionnaires that students complete and return at the end of each semester. The ISCAP directive board is one of the most important stakeholders and no feedback was provided. Other disciplines' teachers were not listened about BS. It is possible that BS disciplines have a strong influence in other disciplines. The use of new assessment methodologies, especially based on information systems could be further investigated. It should be interesting to know how effective they are.

As demonstrated previously, BS environment has characteristics that could be used also in other education levels, and in other institutions. As this is an exploratory case study, further research is needed to give additional insights about new accounting education methodologies. Questions such as, 'What are students' perceptions about BS disciplines?', 'How BS disciplines are seen by different stakeholders?', 'In accounting professionals' opinion, what can be done to improve BS environment?', 'Is the assessment system of BS disciplines efficient and effective? Why?' can be responded in the future. In other related areas of knowledge it would be important to know how higher education disciplines can be more effective in terms of student learning.

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