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Reflections about the use of information and communication technologies in accounting education

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Abstract

The teaching of accounting sciences requires innovative alternative methodologies that allow a greater dynamism in students' learning processes, encouraging their autonomy in order to foster greater understanding and ownership of accounting topics covered in class. In that sense, the use of ICT for educational purposes has been positioned as a dynamic and interactive alternative that allows the application of knowledge and encourages the feedback in the learning process.
This paper aims to reflect on the use of ICT in accounting education as a strategy to improve teaching and learning processes in students of the Department of Finance of Metropolitan Institute of Technology of Medellin. It is proposed a teaching method with a learning virtual object through a virtual mediator of accounting formulations. It has a pedagogical purpose of providing students with a conceptual and practical tool to interpret and analyze accounting and financial topics at the enterprise level.
It is observed that the interaction between accounting graph logic and logic of dynamic perception facilitates the processes of teaching and learning in the disciplines of accounting and finance. It is reflected in greater motivation and understanding of mathematical equations in financial area that will carry out to experimentation of knowledge learned in the classroom.

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Keywords: ICT; accounting sciences; teaching; learning

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1. Introduction

In the world and particularly in Colombia, there are different forms of communicative interaction between people with varied economic exchanges adapted from each epoch and every context of accounting development. Thus, humans have developed the tools to set the knowledge associated with modernity in the accounting area: dynamic variables, rules, resources, techniques and technologies. This has influenced the ways of thinking and practice of accounting education in the world. In a country as Colombia, it has a number of studies and knowledge associated with generating best practices of accounting education in university contexts.

Currently, the accounting discipline requires best practices in teaching and learning in various educational contexts, and in different processes and professional activities. There, it can use better perspectives and methodological approaches such as the social and educational constructivism, and philosophical and epistemological pragmatism of accounting. It can be implemented with accounting teachers to be better teachers and make significant teaching with the use other non-traditional forms of education.

In the hands of currently society and the information and knowledge economy, accounting education and its teaching processes now have a key technological emphasis to the information and pedagogical economy based on technological and active guidance. These perspectives are based on key aspects of the information economy that works on networks and as a global economy (Castells, 2000). To ensure that accounting be part of the social and the economic in the world, it is required better and more effective methods of teaching and learning besides the only pragmatic accounting.

These aspects belong to different disciplines which seek to organize the academic training from the general to the particular knowledge. Future accountants put this knowledge at the service of society to solve problems and provide systems of information from public and private companies. Generally, accounting students in Colombia learn about areas such as accounting, finance, budgets and costs in a rote-linear manner without take into account their applicability. Students have greater cognitive clarity of understanding the financial, political and economic aspects when they know the applications of these areas. It allows them to be the architect of their own destiny and provide a proactive way to solve problems associated with the contexts in their country.

Knowing and practicing different forms, methods and techniques help to accounting teachers and their students to have a meaningful and fluid teaching-learning process. In this way, the aim of this paper is to investigate how teachers can be more innovative teaching accounting through technological resources. So the question that guides this discussion is: How do you teach accounting formulations through technological pedagogical mediator with Virtual Learning Objects and accounting analysis?

A teaching method with a Virtual Learning Object is proposed through a virtual mediator of accounting formulations with the pedagogical purpose to provide better teaching for students and a conceptual and practical tool to interpret and analyze corporate accounting and financial aspects. In this case, it gives an articulated vision between practicality and mathematical precision and between the equation and the financial problem. The teacher in the process of social, cognitive and academic training should define methods of teaching-learning where theory and practice are combined and accounting with other disciplines too.

2. Accounting education from a theoretical perspective of pedagogy

Pedagogy as a science of education has a fundamental influence on the practical learning process of specific variables and metrics to financial accounting. Pedagogy applied to the teaching of accounting education is considered from epistemological aspects according to the technical reason of for being social as a committed accountant with the society since practical aspects of how to use better methods, formulas and mathematical algorithms, and how to be more precise in making financial, economic and business decisions.

Accounting education is understood as the process of teaching and learning of "the accountant" which is self reflection of the activity of accounting in a society, economy and business. Education can approach the formulations of this knowledge and its impact on the social analysis as key aspects in the technique of financial process for all types of people in higher educational settings.

Currently, accounting education is a transmitter and disintegrated education with technological aspects. In this sense, it is proposed pedagogical mediations to improve part of this situation with a better analysis of the teaching process and alternatives based on technology and systemic understanding of financial process, using visualization, graphing and its analysis.

The instructional model seeks "to achieve learning by information transmission". In this model of education, student learns by repetition, copying or imitating, because he learns mechanically as a receptor without creativity. Thus, it is necessary a new school based on the model of learning by practice, it means, learning occurs by "discovery" (De Zubiría, 1997).

3. The importance of ICT on academic accounting programs

Information and Communication Technology (ICT) can be defined as a set of information, electronics and telematics technologies, using modern microelectronics, telecommunications and computing to develop all kinds of devices, techniques and processes that impact different areas of human life. So, ICTs can be based on computational and informatics tools that process, store, summarize, recover and provide information in order to transmit, share and socialize knowledge.

In businesses, financial and economic decisions are "a human construction and a form of culture that is characterized by the ability to understand, predict and control phenomena which surround the human being; technology is in culture" (Mejía, 2004).

The advance of new technologies and social changes that occur in the current accounting education requires ICT to support the student learning development. Therefore, it is necessary to stimulate new interdisciplinary tools that teachers and students understand in the accounting area with the implementation of ICT within the classroom and in their processes of accounting education. So as suggested by the IFAC (International Federation of Accountants) through IES 2, Content of Professional Accounting training programs (IFAC, 2008, pp. 39):

> The component of information technology should include the following topics and competences: (a) general knowledge of information technology, (b) knowledge of the control of information technology; (c) competences of control information technology, (d) user competences of information technology; and (e) one or a mixture of the corresponding competences to managerial roles, evaluation and design of information systems.

In the dynamic scenario of accounting education from educational spaces of higher education, there are difficult aspects on its teaching (Strajman, 2013). For example: the lack of expertise, inadequate training received from teachers, unwanted changes in your own role and logistical problems associated with their integration into the classroom for the better and greater use of technology tools associated with the teaching-learning process.

It might mean that accounting education in Colombia with the inclusion of ICT should be part of pedagogical and didactic scenarios where expert teachers in these areas are required. Moreover, it shows the need for combining different disciplines as a support (computers, mathematics, graphic and audiovisual design, economy, communications, sociology, psychology, etc.) and new educational policies that enable an interaction of accounting education with ICT.

ICTs are a valid tool to improve the educational process to change the way in which students learn and teachers teach. Also, it helps to modify the instrumental character that should be secondary in the educational aspect. In the field of implementation of these technologies, the teacher cannot get them as a "fashion". He should know about them and be very clear about the purpose of their implementation. Furthermore, teaching-learning process of accountant must to preserve in his formation the social scientific training that aims to solve social problems by Virtual Learning Objects (VLO). They are educational mediators that have been intentionally designed for a learning purpose a technological nature which serves members of the process to explain-demonstrate some model or technique in a field of knowledge.

A VLO has content, learning activities, context elements and metadata. This metadata are data descriptors that are included in the document for easy storage, identification and recovery, which makes it different from a computing object (Ramirez, 2013). Its content its learning activities and its context elements should be designed by the teacher as an organized structure to guide a group of students in multiple paths to confront their ideas with a scientific and critical sense toward a virtual learning community. The student is interacting and solving multiple tasks in diverse situations that raise the understanding and practice of interactive objects. They are generally knowledge objects associated with a teaching-learning process in an active methodology.

Applying a VLO in accounting is currently very important. It goes from own computing applications of accounting and technic process to graphics and financial variables for their models to decision-making and financial, legal and accounting responsibilities. However, the relation between accounting education and Virtual Learning Objects needs to be redefined. It is a new field in terms of methodology and research without a clear structure. Additionally there are several pragmatic clashes between people who are studying this research field and those who presume it still too registrar.

The purpose of working VLO is to build and demonstrate a logical proposal of interaction between accounting education and technological practice of a pedagogical virtual mediator, which increases the ability to display a proposal behind the financial problem in terms of a technological vision from a business perspective to the didactics of dynamic image and mathematical function analysis.

In this case, present a new method of accounting education is the key to the process of interaction between accounting education and understanding of the learner, who is a virtual mediator in the teaching-learning process from accounting formulas using a technological tool integrated by accounting and arithmetic. This method proposal as a VLO enables a visualization of integrated and holistic formulas, graphs and analysis through a complex and complete process to teaching financial variables that allows have greater precision and technical and technological objectivity.

Teaching accounting formulations through a virtual educational mediator type OVA is an accurate alternative to integrate current technology with a logical teaching-learning process, being didactic, comprehensive and oriented to image viewing with a sense of active and proposed construction of the financial learning process logic. This is achieved by the intrinsic motivation of the person, manifested by the precision of the formula through the algorithm and the attention of the dynamics of the image with the perception of the sense of financial problem.

In that time, it has been taken into account conceptual elements of understanding and reflective praxis such as the notion of cognitive interaction between the dynamic image and perception of understanding of the accounting procedure. They are correlated with a perspective of constructive interaction of teaching and accounting for development of the virtual mediator. Then for math graphing, it was proposed an improved theoretical perspective of financial mathematical calculus in one and several variables to improve the precision of the formulation and mathematical deduction. Finally, an objective application of the dynamic graphical of accounting formulations is accomplished in different scenarios and examples.

In this case, the interaction between the graphic and explicit discursive logic of a financial function promotes constructive interaction of learning from the questions and meanings of people interacting with the tool. This action facilitates the interaction between technology, pedagogy and accounting communication, which interacts in meaningful perception of people to approach the tool as a function of learning and simulation of the actual process they want to teach.

The virtual mediation facilitates the decision making process in the virtual learning mediation. It is conceived as a practical pedagogical application process of computer technology VLO in the teaching-learning process. In the traditional method, a problem-based learning is guided. However, the interactive part is not visible, and there is no dynamic ingredient where graphics changes and movements are made and the student observes, analyzes, and concludes. In the traditional method, but also it can guide a learning based on problems, the interactive part. The analysis done is synthesized in Table 1 through a comparison between traditional and VLO models.

Table 1. Comparison between traditional and VLO model.

	Traditional Model	VLO Model
Subject of learning	Reproductive Static (Chalk and board)	Productive Dynamic (Dynamic Software free)
Learning by	Slow understanding (observation data, data analysis, conclusion, data feedback and calculations)	Fast understanding (observation data and graphics, data analysis and graphics, conclusion, feedback introducing data and dynamic graphics)
Evaluation	Summative, based on trial and error (written and rigid evaluation)	Formative, constructive comprehension levels (open evaluation with analysis of results according to the graph)
Teacher	Information provider or transmitter	Provider or transmitter of information that becomes in guide of learning, transfers control to the students through the simulation and interaction with the VLO
Student	Consumer/receiver information	Increasingly autonomous. Decision maker

4. Conclusions

In modern accounting education, in countries like Colombia, is essential to think and develop better and new teaching-learning methods of accounting. To that case, a method as virtual mediator in the teaching and learning of accounting formulas with free software tools technology was proposed. At present, the education needs pedagogy. Teaching requires to be clear about the purpose to which is wanted to arrive, the way students learn and grow, what kind of experiences are appropriate and effective, and what techniques and procedures are effective to perform the process.

Sometimes students are not interested in the learning process because they consider it monotonous and boring, have no motivating for the learning, are passive, no appropriate strategies, etc. That is the reason why is important the proposed model, which used ICT, something that is very close to the current generation. Furthermore, the use of software allows movement, change and in short time the student gets answer to his questions.

Model proposed is an appropriate strategy, with appropriate techniques where the student uses this tool for learning. It allows contextualize the analysis cases; perfect the use of memory in the applicability of knowledge-sharing strategies where he is more independent using active participation strategies which can test his creativity, and increases collaborative work in the classroom and the discussion of real problems by using these technologies.

The interaction between graphical accounting logic and dynamic perception logic facilitates the teaching and learning of accounting students, which is evident in the expressions of motivation and sustained understanding with analysis of the teacher interacting through the facility tool. Also, expected results with the accuracy of mathematical calculations make possible to focus on some financial mathematical equations to a most effective process in the projection of a scenario of teaching and learning to learn more, to better understand and visualize more effectively.

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