PEDAGOGICAL, CURRICULAR AND DIDACTIC ELEMENTS INVOLVED IN THE CREATION OF AN E-LEARNING ENVIRONMENT: THE CASE OF A COSTA RICAN UNIVERSITY

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ABSTRACT

This article presents the results of a descriptive phenomenological study with mixed approach carried out to identify the pedagogical, curricular and didactic elements involved in the creation of an e-learning environment for the students of the course Directed Research I at the State Distance University in Costa Rica (UNED). As for the method, it is guided by a process of concurrent triangulation where there is a preeminence of data of a quantitative nature that are complemented and validated with qualitative data. Questionnaires were applied to all 60 students enrolled in Directed Research I and interviews were carried out with three tutors. Findings show that most students are satisfied with the pedagogical, curricular and didactic elements of UNED's educational model. However, both tutors and students agree on the need to strengthen actions that promote meaningful learning. The conclusions point the need to orient the teachers' work to the students' necessities using the potential offered by ICT for the generation of educational proposals in the form of e-learning.

Keywords: e-Learning, distance education, higher education, instructional design.

INTRODUCTION

Several issues have significantly influenced the educational contexts at universities: its overcrowded access, the use of Information and Communication Technologies (ICT), as well as the transformations caused by the rapid advancement of digital technologies. Hence, different initiatives have been developed and implemented since several decades ago, seeking, on one hand, to provide access to digital technologies and, on the other, to offer guidelines to various educational stakeholders so that they accept and use technology in the classroom and the community, understanding that technology by itself does not necessarily generate the desired changes.

With the incorporation of ICT in the educational contexts, learning and the experiences obtained have evidenced a number of factors, interests and common challenges, focused on promoting and consolidating teachers' networks and communities to encourage permanent updating and renewal of the activities programs with the help of ICT that favors the encounter and collaboration to facilitate access to the coming knowledge (Coll, 2008).

Results from recent research have shown that the greatest difficulty is to transform the culture of teachers, students, and other curricular stakeholders; for them, there are

strong barriers and resistance to change roles and everyday practices, particularly to work collaboratively and to systematize their practice in an exercise of reflection and production (Fullan and Stiegelbauer, 1997; González and Tarrago, 2008). These aspects are necessary for learning to learn-to-learn, as a fundamental element for the realization of educational innovations that improve the University reality. Thus, beyond solving the ICT access and preparing teachers for their use, the focus must be on achieving that this knowledge reaches the classroom from different sources of interaction and knowledge production.

In this regard, the National Distance University (UNED) is a pioneer higher education institution of Costa Rica, which has been transforming its actions through ICT incorporation to various areas. However, there is a need to improve the use of their technological resources, particularly platforms such as Moodle and Blackboard, expecting that this action will result in better practices for teaching and learning.

In the global scenarios, social and scientific phenomena have an effect on society and educational systems in particular. Thus, rapid advances in ICT, globalization, virtual teaching and learning environments, new educational stakeholders and innovation have transformed the traditional teaching and learning schemes (ANUIES, 2004). Currently, educational systems have been transformed, allowing a change in educational processes and the diversification of interaction mechanisms between the different curriculum stakeholders.

The distance educational model offers flexible and self-managed learning, at the same time providing education to people from various geographical, economic and cultural contexts. There are a series of educational modalities that provide flexible and democratic teaching and learning environments in distance education, such as e-learning, b-learning, m-learning, u-learning. This raises the need to deepen on the contributions offered by the pedagogical, curricular and didactic principles that characterize the university's educational model.

The facilities offered by e-learning as an educational modality are undeniable, due to the strong expansion of the Internet, to the various resources and to the multiple strategies that ICT enable in teaching and learning environments. This educational modality is rapidly expanding globally, not only in higher education but also in primary and secondary education, creating various distance educational scenarios for children, adolescents, and adults. Therefore, through diversification and globalization of formative actions political, economic and social transformations are encouraged to allow the construction of a more equitable, solidary and sustainable society (Baltodano, 2013; Gomez-Zermeno, 2011; Otero and Cabrera 2012).

For this reason, the research question was established: What are the pedagogical, curricular and teaching elements involved in the design and development of training actions in the e-learning modality that will facilitate the attainment of meaningful learning in students of the undergraduate program in Education of the UNED in Costa Rica? The general objective of the study was to determine the pedagogical, curricular and teaching elements that permit the creation of a teaching and learning environment under the *e-learning* modality, that facilitate the achievement of meaningful learning by students of the course Directed Research I, part of the undergraduate program in Education at the UNED in Costa Rica, during 2014.

In UNED's pedagogical model, knowledge is managed with the support of virtual learning environments, so the incorporation of ICT in teaching and learning processes has an important place within the university's education system. The importance of developing research related to teaching and learning processes within virtual environments is valuable since it provides the theoretical and practical knowledge of how to incorporate the technological element into education systems. Thus, to encourage the development of educational designs and teaching resources for learning that will facilitate a direct

procurement of achievements and progress in the training of a large number of people, synergies must be generated to promote the interaction and exchange of experiences that have an impact both, on the solution of social problems and on the discovery of new findings of the science field.

According to this, the design and development of educational models supported by digital technologies are nurtured by innumerable learning possibilities for the students of the *Directed Research I* course. Under this new order, the design and development of virtual training are redefined to focus its attention on the student as a whole being that needs encouragement to generate knowledge and overcome everyday problems.

When designing and developing strategies for teaching and learning with the use of ICT that facilitate mediation activities, a comprehensive and innovative vision on the use and access to technology that could occur between students and teachers will be provided. Similarly, the study intends to assess the pedagogical, curricular and didactic contribution of the distance education model that enables the incorporation of ICT in strengthening and renewing UNED's educational offer. This was relevant, since it meant to carry out a process of introspection on how to operationalize the components of UNED's teaching model, for offering a quality mediated education through virtual teaching and learning environments.

Another contribution of this study is the design and development of a methodological strategy under the e-learning modality that responds to the interests of the involved students in the educational process, the theoretical principles of learning and UNED's teaching model. Thus, responding to concerns that could serve as reference to build other research, make decisions or implement improvements in other educational contexts.

THEORETICAL FRAMEWORK

Elements of Innovation and Educational Transformation

In the higher education systems, transformation and educational change play a big role because they involve constant renewal and adaptation of education to the demands of the economic, political and social systems. At the same time, ICTs have driven a real influence in these contexts, which has boosted educational innovations in response to the need to transform the socio-educational scenarios constantly.

All innovation must have an effect on educational institutions, students and staff, contributing to achieve a culture of continuous training, and enabling actors to update their knowledge. In this sense, there must be a change that favors the improvement of the various actors' attitude. However, it is important to consider that for the achievement of this attitudinal change other internal actions must be generated within the organizational structure; and therefore evidence that something is changing (González and Tarrago, 2008).

Beyond the belief that the educational problems arise at universities generated by the non-incorporation of ICT, one must question, what are the aspects of the socio-cultural environment that are negatively influencing the member's attitude at the organization? In connection with the above, the attempt to change people's attitude is one of the hardest things to do within institutions; it is at odds with the resistance that human beings present when dealing with behavior modification, since many of these behaviors are based on values and personal beliefs (García, 2001). To generate expectations of change in an organization or educational institution an awareness process must start that will gradually influence the minds of people, opening new airs of change that allows organizational actors feel secure and motivated to undertake processes and future tasks (Fullan and Stiegelbauer, 1997; González and Tarrago, 2008).

When it comes to sources of innovation, it is important to consider two aspects: the first one is related to those which will benefit from the change, and the second is related to

the technical reliability of the change. In this regard, it will be necessary to monitor that the change is not seen by the actors only as a way to obtain economic advantages or otherwise; also that the proposed actions will establish the intervening values in change, the potential benefits, the degree of priority that these will have within the educational institution, the feasibility and which other areas of potential change would be uncovered (Fullan and Stiegelbauer, 1997).

Likewise, adjustments to policy should be done within the generation of a culture for the permanent training of actors and agencies involved in the process of educational transformation, through activities that promote awareness of people within the institutional priorities.

Foundations of Distance Education

A proposal for an e-learning program and its design depend specifically on the pedagogical model that guides the process of teaching and learning, which enables an integrated learning, with various activities and interaction of students in different dimensions: student-object of knowledge, student-university, student-student and student itself (Centro de Capacitacion y Educacion a Distancia, 2013). Additionally, the educational process contains two senses: first, a movement or a process and, secondly, an interiority which rises habits and ways of living. Therefore, through the immediate improvement of human capacities, the mediate enhancement of the person is achieved, which is to say that the educational process is much more than only transferring knowledge. In the same way, education is not synonymous with instruction, although it is contained. The difference is that education should transcend the academic approaches and should think of the human being as a whole.

On the other hand, pedagogy is associated with everything related to the educational and teaching process and the formal and informal learning in different environments and contexts. Within pedagogy as an action, the curriculum is characterized by its complexity, dynamism and constant evolution, since it covers a series of elements and factors involved in the educational process, as well as their interrelationships within the pedagogical actions. Its dynamism and evolution largely responds to social, cultural, political and economic changes. In other words, the curriculum focuses on the realization of all kind of actions and educational modalities levels. The curriculum has different meanings depending on the contexts where it develops, in this sense, the curriculum becomes contents, forms, schemes and achievements that enable access to knowledge changing, dynamic and in dialogue with the culture (Gimeno, 1998).

The distance educational model generates strategies to enhance and enable the learning of the students from the pedagogical provision by teachers and of teaching resources used for the implementation of the mediation activities. Thus, learning is enhanced when the student discovers that it is able to learn for itself and also that what it is learned has practical and utilitarian sense in its socio-cultural context (Zambrano, 2006). Also, from the constructivistic theory, that learning must be significant, learning is related to substantial cognitive structure so that the logical meaning of learning becomes a psychological meaning for the student (Moreira, Caballero and Rodríguez, 1997), and therefore provides a sense and meaning to the disciplinary knowledge.

On the other hand, another essential element in the process of teaching and learning is the didactic iself, as an expression of the forms of teaching and of actions allowing to investigate empirically and theoretically the sense of education to reach conclusions and recommendations that make an effective teaching. All of the above has a direct impact on the academic dimension of the student, but also in the construction of values and attitudes in human beings (Tejada, 2005; Ordonez 1996). The pedagogical, curricular and didactic components define modeling and its characteristics which take the form of the act of educating at an institution of superior education.

Quality Education in the Training Activities in the Form of E-Learning

In distance education, the quality of education has several components primarily related to the pedagogical principles of the process. This implies a coherence between the curricular elements and expectations generated by the cultural context and the teaching model of the institution. On the other hand, it is necessary to establish relations between goals and objectives and the objectives achieved, as well as knowing the validity of intervention strategies, educational resources for learning and teaching mediation among others (Garcia, Ruiz, and Dominguez, 2007).

The criteria that focuses on teaching and learning strategies, planning, teacher's role, the media or platforms and the teaching resources for learning are essential in a quality proposal for training activities in virtual environments. This highlights the need to strengthen the process of continuous improvement of courses or training programs.

Within the *e-learning* mode, elements of improvement are necessary and in this sense the evaluation and research related to the betterment of the proposals is essential. On the other hand, in this type of initiative, activities or other components of the design are not unfinished products and require a constant and accurate renovation (Meza, 2012).

Thus, each university should offer training activities under the *e-learning* modality setting criteria or quality parameters that conform to its teaching model and the guidelines that govern the curricular, didactic and technological actions. This is a complex task, involving the active participation of all the curricular actors implicated in the process.

Regarding the pedagogical mediation and the role of the teacher in virtual environments, it is important to consider that to engage in the professional field, there is a necessity to protect the practice with a theoretical position, from which power is exercised, having clear epistemological, pedagogical and curricular reference level. Therefore, as in all educational systems, in distance education the pedagogical practice is exercised from the theory and the premises of the model or curricular and didactic approach of the educational institution.

In the *e-learning* modality, the virtual teaching and learning environments offer the possibility of generating training activities in which people, interested in a topic or common themes, interact using different media and technological resources. One of these resources are the virtual platforms or Learning Management System, which are tools to manage the process of teaching and learning (Area and Adell, 2009). It is also necessary to gear the teaching resources to the achievement of educational objectives that develop different competencies with the study of the material and awaken the student's interest.

METHOD

This study takes a mixed method approach, which rises from the combination of the quantitative and qualitative approaches (Hernández, Fernandez & Baptista, 2010). The quantitative approach offered the possibility of generalizing results more widely, also granted control over the phenomena from the point of view of counting them and their magnitude. The qualitative approach, on the other hand, allows the researcher to deepen on the ideas, expand them, give interpretative richness and contextualize the phenomenon under study in the work field. In terms of the study's priority, the quantitative approach had greater precedence. The qualitative approach was used in addition to validate the results obtained when using the processing and analysis of information collected through the questionnaires, both methods were applied simultaneously.

Mixed research designs with concurrent approach involve separate and parallel procedures in the collection and analysis of data from quantitative and qualitative nature. Regarding its components, the methodological design was concurrent, because

quantitative and qualitative data was collected and analyzed in a parallel and separately way (Hernández, 2012; Hernández, et al., 2010).

Sociodemographic Context

UNED is a public institution of higher education in Costa Rica that offers professional training to the student's population within the distance education model; it was created in 1977 with the aim of providing quality higher education to the disadvantaged sectors of the Costa Rican population. UNED has four schools: Management Sciences, Exact and Natural Sciences, Social Sciences and Humanities and Educational Sciences. It also offers postgraduate studies thru master and doctoral programs.

The school of Educational Sciences began in 1978. Currently the school offers seven graduate programs which are: Educational Administration, Special Education, Pre-school Education, Computer Education, Basic Education, Social Studies and Civic Education and teaching.

The undergraduate program in Education started in the school of Educational Sciences in order to train professional graduates of different areas, not related with educational science programs, who are teaching. Thus, as an enrollment requirement, candidates must possess a bachelor's degree in any area of knowledge. The curriculum of the undergraduate program in Education consists of ten subjects with 3 credits each. Once concluded the materials of the syllabus, students must enroll in the Directed Research I course to develop their Bachelor's thesis.

Population and Sample

The population was determined by certain content, time and place characteristics (Hernández et al., 2010; Hurtado de Barrera, 2010). Regarding the particular case of study, the population was comprised of 60 students from the undergraduate program in Education enrolled in Directed Research I course, 3 tutors and the course's professor.

The sampling process is performed in research when there is no capacity to work with the entire population and is required to make result generalizations, in such a way that the products obtained from the sample's information may be applied to all members of the population. In the particular case of the research, we worked with the total population in study, therefore it was not necessary or justified the use of any method for the selection of the sample (Hurtado de Barrera, 2010).

All participants considered within the population were constituted into study subjects because they provided data and direct information in relation to student's socio-educational features, the basics of pedagogical, curricular and teaching of UNED's educational model, the theoretical principles of learning that facilitate the creation of the Directed Research I course in e-learning modality and the components for the design and development of a learning and teaching environment under the *e-learning* mode.

Instruments

The required information to determine the pedagogical, curricular and teaching elements that allow the creation of a teaching and learning environment under the e-learning modality that facilitate the achievement of significant learning of students at the Directed Research I course, was collected through a questionnaire addressed to them, and as a complement a structured interview was applied to each of the tutors and the course's professor.

The data collection was a process that required prudence, patience and order. The questionnaire is an instrument that consists of a series of written questions to be resolved without the researcher's intervention. It was developed taking into account the variables, dimensions and indicators of which we wanted to obtain information and the educational level of the people who answered it; it consists of 40 closed questions.

On the other hand, and as a way to validate the information gathered through the questionnaires, a structured interview was applied to each tutor of Directed Research I and the course's Professor. With the implementation of this instrument, subject data was gathered directly face-to-face, through a meeting for the exchange of information (Giroux and Tremblay, 2004; Hernández et al., 2010). The interview guide had 4 questions and each one requested respondents to refer the dimension on which information was required.

Data Analysis

For Selltiz (1976, cited by Balestrini, 2001), the purpose of the analysis is to summarize the observations carried out in such a way that they provide answers to the research questions. However, the process which involves the analysis was not only delimited to the description, but it sought to relate and interpret the meaning of the information expressed by the subjects. In this regard, Rodríguez and García (1999, cited by Hurtado de Barrera, 2010), define the analysis as a set of operations that involve transformations of data, reflections and verifications, among other things, being made to extract relevant meaning in connection with the investigation.

The mixed research designs with triangulated concurrent approach involve separate and parallel procedures in the collection and analysis of data from quantitative and qualitative nature. The data obtained through the questionnaire was analyzed independently of the data gathered through the interview and it was up to interpretation and discussion outcomes that it was contrasted and analyzed from a quantitative and qualitative perspective with the theory in the study (Hernández et al., 2010).

The analysis of the information obtained through the questionnaires was performed using descriptive statistics by assigning codes with scores to each response option offered by the participants. The criterion to analyze information was the product of the operationalization of variables and indicators, this facilitated obtaining valid conclusions; and in addition, raised concrete and objective recommendations on the researched topic.

For the analysis of quantitative data it, a database was coded and tabulated in the IBM SPSS Statistics for Windows, 20.0 program. Later the absolute and relative frequencies were calculated, as well as the simple and weighted averages. Variables, dimensions and indicators were represented by tables and graphs to summarize the views of the respondents.

On the other hand, the information obtained from the interviews was faithfully typed according to the interviewees' opinions. The information was ordered, encoded, processed, tabled, represented and analyzed according to the meta-categories, categories and sub-categories of the analysis matrix (Table 1). Initially it was reviewed and organized in accordance with each of the specific objectives, then the data was categorized; the categories were coded; the data related; the data processing applied; the results were graphically represented; they were interpreted, discussed and, at the end the conclusions and recommendations to study events and the respective categories and sub-categories of analysis were obtained. The information obtained through the interviews allowed to supplement the information that was derived from the analysis of the questionnaire's data.

Table 1. Matrix for the construction of instruments and data analysis

Object of study	Variables/Meta Categories	Dimensions/Categories	Indicators/sub-categories
Elements that allow the creation of an e-learning teaching environment	Socio-educative characteristics of the students	Social	1. Genre 2. Age 3. City 4. Civil status 5. Work status
		Technology use and access	6. Access to computer 7. Educational use of internet 8. Own means to access internet 9. Ways to access to internet 10. Frequency of internet use
		Competencies for distance learning	11. Compliance with deadlines 12. Understanding and following instructions 13. Support management for problem solving 14. Writing 15. Information research
	Pedagogical, curricular and didactic foundations of the UNED's educational model	Pedagogical	16. Learning actions 17. Student's role 18. Teacher's role 19. Teaching and learning strategies 20. Perception of distance education
		Curricular	21. Sociocultural context 22. Objectives 23. Contents 24. Methodology 25. Learning assessment
		Didactic	26. ICT use 27. Material production 28. Understanding 29. Structure 30. Flexibility.
	Theoretical principles of learning that facilitate the creation of an e-learning course	Learning	31. Previous knowledge 32. Significant learning 33. Motivation and orientation 34. Interaction 35. Creativity
	Components for the design and development of an e-learning environment	Instructional	36. Content distribution 37. Content and objectives 38. Didactic material 39. Learning activities 40. Assessment criteria

Reliability and Validity

An instrument's reliability of a measurement is associated to the level where it produces the same results if it is applied repeatedly to the same individual. For the establishment of the questionnaire's reliability criteria, the method of split halves was applied, which had the advantage of allowing the application on the same day and with the same sample. The method is to divide the whole of items into two halves and apply them at different times

to the same subjects. Subsequently, the scores or results of both applications are compared through Pearson's r correlation coefficient.

For purposes of the questionnaire's reliability, it will be considered reliable when the value of Pearson's r linear correlation coefficient for the two halves (and odd items) r is greater than or equal to 0.75. ($r \geq 0.75$). The reliability test was applied jointly with the pilot to 10 students graduated from the undergraduates program in Education. The correlation of the two parts of the questionnaire score was, for Pearson's r correlation coefficient, 0.76. This demonstrates the reliability of the questionnaire through the described mechanisms.

On the other hand, according to Hernández et al. (2010) the validity is associated with the degree in which an instrument really measures the variable that is intended to measure. In relation to the questionnaire's validity criteria, it underwent various procedures to ensure its validity, given the need to determine up the questionnaire's extent when measuring the research variables.

In connection with the above, for the investigation the experts' validity or consequential validity was considered as a reference point to determine the degree in which the instrument measured the variables under study, in accordance with the criteria of qualified voices (Hernández et al., 2010). Serving the prerogatives previously exposed, the questionnaire was submitted for their respective validation criterion of three experts from the Direction of the Technological Resources of the Ministry of Public Education of Costa Rica. After the review, their observations were considered and contributed to the improvement of the questionnaire.

In relation to the interview guide, the procedure followed by the researcher to demonstrate the internal validity or credibility of the instrument were: the prolonged stay in the field for its application, audit from colleagues, comparison against the theory, the matrix for the instrument's construction and instrument's questions, discussion of the instrument with the participants, a list of their prejudices, researcher's beliefs and customs before the construction and application of the instrument (Hernández et al., 2010).

Considering the approaches previously described, the interview's guide was submitted to the judges who participated in the questionnaire's validation. The experts determined the relevance of the interview guide in terms of the questions concordance and the relationship with the subject under study. After the review the observations made by the experts were considered to improve the instrument.

Similarly, the questions from the interview's guide were compared with its meaning according to the theoretical framework, this allowed for a reflection on these. Also, previous to application, the instrument was given to the interviewees, seeking respondents' evaluation about the instrument's clear communication. Finally, prior to the construction of the instrument, a detailed reflection of the researcher's prejudices, beliefs and customs who could induce bias during the process was done.

Pilot Test

The piloting of a measuring instrument consists on its administration to people with similar characteristics, whose results are used to calculate the initial reliability and validity if possible. The pilot allowed to validate the initial conditions of the instrument and the conditions for its application. The pilot test was applied with a small sample, between 10% and 20% of the total population (Hernández et al., 2010). For this reason, the sample used in the implementation of the pilot study was of 10 students graduated from the undergraduate's program in Education, which represents 10% of the population.

In the study, the pilot was applied as a means to verify the reliability and the initial validity of the questionnaire. With the obtained results, the correlation coefficient of the

questionnaire was obtained and some changes were made in the wording of items; in addition to changes in the wording of the general instructions.

RESULTS AND DISCUSSION

The quantitative analysis to the questionnaires was done thru the generation of graphs and tables with absolute frequencies, percentages and averages obtained from each of the questions posed and in accordance with the variables, dimensions and proposed indicators. On the other hand, the qualitative analysis is based on reasoning by meta-categories, categories and subcategories that allow to know in depth the context (Table 1).

Both quantitative and qualitative data were analyzed according to the order of the data matrix (Table 1). The matrix sets the four axis on which the analysis will be: socio-educational characteristics of students, pedagogical, curricular and didactic basis and theoretical principles of learning and components for the design and development of an e-*learning* course.

In the concurrent triangulation designs results derived from the quantitative and qualitative analysis are interpreted and discussed by contrasting the information obtained with the aforementioned theory. This section allowed to generate information regarding: the socio-educative characteristics of the students; pedagogical, curricular and didactic foundations of the UNED's educational model; theoretical principles of learning that facilitate the creation of an e-learning course; and, components for the design and development of an e-learning environment.

Socio-Educative Characteristics of the Students

Students from the Directed Research I Course were mainly women; also, a significant percentage of the participants were between 26 and 35 years old, which means that the student population of Directed Research I was constituted mainly by young women. In relation to the place of residence, students from the provinces of San Jose, Heredia, Alajuela and Cartago prevail. Also, 60 % of these students are single and the rest are married. On the other hand, the majority of the student population (78.33%) had a paid work.

As for computer access and educational uses of the internet, 100 % of these students have access to a computer and make educational use of the internet. In relation to the above, the surveyed teachers agreed and recognized the student´s use and access to technology; however, tutors associated this use mainly to social networks and not necessarily educational activities. For example, tutor 1 mentioned:

> ***As for access, usage varies greatly in that age spectrum, they handle a lot of use and access to everything they are platforms for social use, everything that is social communication and e-mail, the use it pretty well. However, academic platforms (...) this type of tools almost none uses them and if they have some experience it is not enough.***

Students have their own means to access internet, the devices mainly used are computers and smartphones and the frequency access is daily in the majority of the cases.

On the other hand, considering the skills for distance education, in the opinion of the students, they can meet deadlines for the achievement of the learning objectives, they are also able to understand and follow instructions, find solutions to problems, express ideas in written form and investigate on their own (Centro de Capacitacion y Educacion a Distancia, 2013g). In relation to the above, on average 94% (56 of 60) of positive responses were obtained. However, although teachers recognize on students some skills for distance education, they agree there is a very bad writing quality on the majority of the learners. In this respect Tutor 3 affirmed:

The written expression very bad, there are serious problems in the writing.

Tutors also point to the inexperienced and lack of know-how in research, also in the use of ICT and LMS systems for educational purposes. They also make a significant distinction in skills between students with initial training at UNED and students initially trained at other universities, as tutor 1 mentions:

> ***The student who has been trained throughout his student life at UNED and has more years in the UNED system has better tools for self-regulation of learning.***

Pedagogical, Curricular and Didactic Foundations of the UNED's Educational Model

In relation to the pedagogical basis tutors apply, students felt positively with tutors' educational actions related with: the motivation, the strengthening of the role of the student, the role they play, the teaching-learning strategies for continuous improvement and the design of strategies and materials to promote online learning (Centro de Capacitacion y Educacion a Distancia, 2013b, 2013c, 2013d, 2013e, 2013f). However, 24.8% of students valued the pedagogical actions negatively, primarily in aspects related with motivation, strategies and materials to promote the creativity and the design of the facilitator's role in knowledge construction. Additionally, in interviews, tutors acknowledged that there is much to improve in relation to the operationalization of UNED's pedagogical model, for this model not to stay only as a theoretical proposal but to be reflected in the praxis and the role assumed by the tutors, especially in the appropriate usage of UNED's resources. Tutor 3 mentions:

> ***The pedagogical model of the UNED, at least in the area of research is lacking, that is, the practical part is lacking … (…) there remains research as to sources of information, to libraries. Students are not accustomed or have learned the necessary skills to make them persistent in sources of information.***

Just as in the previous dimension, an average 71% (42 of 60) of the students felt positively regarding the tutors' curriculum basis, considering that the tutors have given importance to the construction of the knowledge from the socio-cultural context, to the objectives as reflection of learning built during the process, to the content on the basis of the students' knowledge, to the methodological strategies and to the evaluation that stimulates student engagement. Meanwhile, an average of 29% (18 of 60) of the respondents spoke negatively in relation to the criteria previously described, specifically on aspects such as the importance of tutors in relation to the construction of the knowledge from the socio-cultural aspects, the methodological strategies and the evaluation that encourages students' participation. In relation to curricular aspects, tutors recognized the little use of the LMS that UNED does, also the lack of clarity in relation to the development of objectives, contents, strategies of mediation and evaluation using the tools and resources provided by platforms such as Blackboard and Moodle, therefore they consider not viable the design and develop of a research course conducted in the *e-learning* form. Regarding this aspect, one tutors said:

> ***I would not imagine that course totally on line; the students should have a level of use of the technologies, it has to do with digital literacy (Tutor 2).***

In relation with the didactic dimension, a significant average (74, 67%) of the students felt positively regarding the importance for the tutors of ICT use, the production resources, the structure of educational resource that facilitates content compression and the flexibility of teaching-learning strategies. On the other hand, aspects that deserved the most negative opinions were the production of materials and multimedia resources to facilitate learning, flexibility in the strategies employed and the didactic structure of resources that facilitate content compression. In this regard, tutors recognize that they

effectively have difficulties in the use of digital tools such as educational resources within their classes. In this regard, Tutor 2 stated:

> ***The use of communication tools, which the Blackboard platform offers, like video conferencing and others are good tools and I think they are sparingly used, these virtual platform tools must be enhanced. There are some books that seem to me that are not the most appropriate.***

Theoretical Principles of Learning that Facilitate the Creation of an E-Learning Course

This meta-category collected relevant information to the dimension of learning. The results obtained from the questions made to students regarding were mostly positive (60, 33% on average). The consulted aspects were related to the student's experience, mediation activities linked to daily life, motivation and guidance in the learning process, the promotion of interaction and collaborative work and the stimulation of creativity and innovation (Centro de Capacitacion y Educacion a Distancia, 2013c). This dimension was the one that received from students the higher amount of negative opinions, very particularly in aspects such as the promotion of interaction and collaborative work, motivation, orientation and the tutors' guidance in the learning process and the stimulation of creativity and innovative solutions to problems. On the other hand, when considering the tutors' opinions, they pointed the difficulty experienced when incorporating ICT in these processes because of the initial training received and because they belong to a generation of transition regarding the use of digital tools for the promotion of students' learning of the students. On the other hand, they agree that at present, the activities of mediation and other elements that encourage learning are behaviorists and do not favor the full acquisition of learning. Tutors they recognize that it is necessary to concretize actions that contribute to the improvement of teaching practice. In relation to this, Tutor 1 said:

> ***The theoretical principles are seen exactly like this, theoretical ... all that part in classroom practice is quite lacking.***

Components for the Design and Development of an E-Learning Environment

This dimension presented a number of positive opinions issued with the figures representing the highest values on the scale. For the majority of the respondents, their experiences in training actions which were supported by Moodle or Blackboard at UNED, were positive. The questions for this resignation were related with: modular distribution, content and objectives development, the use and production of teaching resources, learning and evaluation activities (Meza, 2012). For their part, tutors agreed that online courses require a modular distribution of the learning objectives. In relation to the above, tutor 3 said:

> ***Definitely the virtual course would have to be presented t in progressive modules in increasing levels of difficulty.***

Tutors also make special emphasis on the need to produce digital content and teaching resources with external links that allow the interaction of the students with information and resources both inside and outside the virtual classroom. They also agree on the importance of having a communication tools offered by the LMS. They mentioned:

Teaching resources and learning activities must be virtual, from the use of video, (…) chat, video conferencing, specialized page uses… we have to resort to a series of media that we can find on the internet (Tutor 2).

I think that the most important thing that online courses gives us is that permanence, (…) a totally asynchronous contact with the students but close, and to know that the knowledge is actually being constructed, but not on a course in itself but a 100% on line course (Tutor 1).

CONCLUSION

This study's objective was to determine the pedagogical, curricular and didactic elements involved in the design and development of formative actions under the *e-learning* modality, that facilitate the achievement of meaningful learning in students of the undergraduate program in Education of the UNED in Costa Rica. The study reflected the need to strengthen the knowledge tutors have regarding the students' socio-educational characteristics, to motivate and contextualize their mediation activities.

Results show that most students made use of the Internet, social networks and had access to digital technologies, it is clear that this use does not always reverts in support for their educational activities associated with the management of information to solve problems and investigate. Also, a significant difference was found between students whose initial training was at UNED and students coming from other universities, in regards to the skills for distance education. However, tutors had consensus that the greatest weakness students had was related to writing and lack of research experience.

Regarding the pedagogical, curricular and didactic basis of UNED's educational model, the majority of students were satisfied with it. However, both tutors and students agreed on the need to strengthen actions that promote meaningful learning. Moreover, tutors were not prepared to manage training activities under the *e-learning* modality, because they recognized the lack of knowledge they have in relation to the use of the resources offered by *Moodle* and *Blackboard*.

As a result, we conclude that to manage a training action of Directed Research I, it is necessary to strengthen UNED's educational model, emphasizing the centrality of the students as protagonists of their own learning; thus from this criterion the recommendations presented below seek to provide inputs to achieve the purpose.

In relation to student's socio-educational characteristics of Directed Research Course I, the university should establish programs and extension courses to provide students and faculty spaces for participation in courses, workshops and seminars that contribute to effective use of internet, LMS, databases and other digital resources offered by UNED for the improvement of teaching and learning processes. In relation to distance education skills, training activities are proposed allowing to improve students' written expression and information management with the use of ICT for the effective resolution of problems linked to educational tasks. Some recommendations for institutions who similarly wish to improve the student – centered learning, are:

- **Implement a pedagogical model that shows in the praxis of the tutors the pedagogical, curricular and didactic criteria that favor the achievement of meaningful learning by the students.**
- **Promote pedagogical actions for motivation and the promotion of student learning.**
- **Design strategies and materials for distance learning to guide the student in the interaction and communication through the digital media.**
- **Build knowledge related to the socio-cultural context of the student body, promoting the development of skills to learn to learn and solve problems.**

- **Manage evaluation strategies that evidence this component as a process and not as a product. Thus, it is imminent the production of didactic resources with a structure and design that facilitates the appropriation of contents and knowledge by the learners.**

Another recommendation is to make use of Maturity Model for e-learning classroom, which aim to transform the institutions' ability to identify their own priorities and quality standards, to support continuous improvement (Espinoza Guzmán & Gomez-Zermeno, 2017)

FURTHER RESEARCH

This study established niche topics and questions that arose under the main findings of the investigative process. The worldwide impact of ICT in university contexts is currently tangible. The historical perspective of investigations with and about ICT highlights the need to explore new horizons to an effective incorporation of these in educational contexts. Social demands and uncertainty, makes necessary to investigate how to improve the teaching practices in contexts with complex and multicultural features. Therefore, considering the results of the study, the following research questions are suggested as future research questions:

- **What are the indicators and/or categories for the measurement and knowledge of pedagogical, didactic and curricular criteria that contribute to the improvement of teaching practices of teachers and to the strengthening of student learning?**
- **How to generate instructional designs tailored to the needs of students and the distance education model?**
- **What are the pedagogical, curricular and didactic mechanisms and proposals that allow effective use of LMS and social networks such as Facebook and Twitter, exploring potential pedagogical uses?**
- **How to evaluate didactic resources for learning and their incidence in the development of students' cognitive and socio-affective skills?**

STUDY'S LIMITATIONS

Every constructive process of knowledge has limitations that can generate disruptive elements within the investigative process. This study presented as a weak point the limited permanence of the researcher in the field, due to the temporal restriction of the study and the type of research chosen. On the other hand, the research was characterized by the application of two instruments for data collection; however, a greater number of instruments and participants could be used to capture more precise information from other curricular actors involved as program coordinators, students and Tutors involved with final graduation work. All of the above highlights the need to continue constructing expectations for a deeper understanding of reality involving a considerable diversity of curricular actors and research designs that contribute to deepening the knowledge of variables and / or indicators that allow the planning, the design and development of training actions under the e-learning modality.

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