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DIAGNOSIS OF INTERDISCIPLINARY RESEARCH TRAINING WITH THE USE OF ICT IN THE CAREER ECOTOURISM ENGINEERING

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A B S T R A C T

The work analyzed the results obtained in a diagnostic study on the process of interdisciplinary research training of university students, with the use of ICT and its dynamics in the career in Ecotourism Engineering of the Faculty of Natural Resources of the Polytechnic School of Chimborazo, Riobamba, Ecuador. This exploratory research, quantitative methods were used to determine the main difficulties related to the procedure in such training. The results showed limitations that are based on the inefficient way in which the dynamics of the formative process develops in subjects of the career, which reveals the need for didactic mediation in said dynamics.

INTRODUCTION

The Information and Communication Technologies (ICT) since its irruption into society have transformed the search, management, treatment and storage of information and the mode of communication between subjects.

They have been occupying a preponderant place in the current university training processes, which has been studied from different perspectives by authors such as: Pardo, M. E. (2004), Left, JM. (2004), Sánchez, L. (2009), Encarnación, E. (2010), Tejada, I. (2010), García, O. (2010), Torres, A. (2014), Silva, J. (2014) , Rodríguez, N. (2014), Tapia, H. (2015), among others.

The biggest challenge of the universities is to be able to make an effective use of these technologies in the processes that take place in them, of which the training for the scientific research of the university students does not escape, within the training process of the professionals. Given the accelerated pace of information and knowledge that is generated every day, currently research cannot be done in isolation by individuals or groups, but increasingly requires cooperative and collaborative work between them, the which undoubtedly is fostered by the effective use of computer networks (Internet, Intranet) and digital technology, which constitute the paradigm of ICT. In accordance with the above, the current demands tend "towards a university network education and research, with a global perspective and strongly supported by ICT", (Univirtual Committee, 2012, p: 7), offering greater possibilities for development and at the same time the increase of the scientific level in any branch of science

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and technology because these technologies according to Schiavo, E. and Ruiz, J. (2012) facilitate cooperative, collaborative, participatory work and the formation of academic and scientific communities in net.

The challenges posed by ICT to the process of scientific research are directed to the management and processing of information, to synchronous as well as asynchronous communication, in the change of the role of professors, students and other subjects, which manifests itself in the use of dynamic participatory and collaborative strategies, in the realization of joint projects that transcend the institutional framework, in the transition from isolated work to the development of joint tasks, with the formation of scientific communities in common themes and research networks and work teams.

To this, new search engines and faster bibliographic managers are added to access more and more information immediately. Online databases with information (of scientific articles, magazines, books, reports and research reports, theses and dissertations, relevant research works such as those published on the Web of Science (Web of Science) and Scopus on any topic of interest in the various branches of knowledge, instant messaging systems that enable communication at the moment with any person on the planet to exchange ideas and share criteria and experiences, among other aspects.

In consideration of the above, this article aims to determine the shortcomings that weekly manifest in the interdisciplinary research training of university students, with the use of ICT and its dynamics in the career in Ecotourism Engineering of the Faculty of Natural Resources of the Higher Polytechnic School of Chimborazo, Riobamba, Ecuador, which can provide valid information for a future didactic mediation in such training.

MATERIALS AND METHODS

A research was carried out in the Engineering career in Ecotourism, in the Faculty of Natural Resources in ESPOCH, Ecuador. The race was selected on the basis that it is where the author of the present investigation works as a professor.

The Engineering in Ecotourism career has: 16 teachers hired, 4 auxiliary teachers, 4 added and 4 main. 53% work in a range of 1 to 5 years, in the 37th level of education, 14% belong to 4 teachers who work from 6 to 10 years; in 25% there are 7 teachers; 1 teacher works from 21 to 25 years, which represents 4% and the other 4% falls on a teacher who works in the range of 26 to 40 years.

In general, they have little experience at the higher level. It has 2 doctors, 4 teachers with fourth level and 15 of the third level.

A survey was conducted to 28 teachers and another to 268 students of all semesters of the aforementioned career. The number of surveys to the second was determined by the sample size that resulted from the total student population (437 students), with a confidence level of 96% and an error level of 3%. The observation to classes of the training process of the race was also carried out.

The diagnosis was made during the academic period: September 2013 - February 2014. Regarding the professors, the time taken in university teaching was considered, which determined that 11 of them have experience between 1 and 5 years; 6 teachers work from 6 to 10 years; 8 from 11 to 15 years old; 2 from 21 to 25 years old and 1 teacher, from 26 to 30 years old.

It should be noted that according to Article 31. CATEGORIES. From the career and career ladder of the ESPOCH professor and researcher, category is defined as each of the groups in which the titular academic staff can enter the ranks. To this effect, three categories are recognized: Auxiliary, Aggregate and Principal.

To carry out the diagnostic study, a methodology was designed to diagnose the training process

The methodology had the following action

Establishment of indicators for each applied instrument (survey and observation)

In the survey for teachers, the following aspects were taken into account:

- Basic knowledge about Information and Communication Technologies (ICT).
- Employment that is given to the interactive platform of the ESPOCH in his career.
- Technological resources used during the career teaching process.
- Application of collaborative work through ICT.
- Carrying out activities framed in the application of knowledge through the development of projects.
- Use of methodology to promote research, self-learning, information search, analysis, debate and socialization.
- Knowledge of virtual communities.

Survey for students, aspects to consider

- Basic knowledge about Information and Communication Technologies (ICT).
- Employment that is given to the interactive platform of the ESPOCH in his career.
- Use of technological resources used during the career teaching process.
- Carrying out activities framed in the application of knowledge through the development of projects.
- Knowledge of virtual communities.

The observation was made with the objective of assessing the training process of the Ecotourism Engineering career from the edge of interdisciplinary research and the use of ICT.

Analysis indicators

- Roles played by the teacher and the student and if they promote a professional interdisciplinary techno-research dynamic.
- Methods and procedures used in the training process and if it promotes and facilitates the development of skills and attitudes that favor collaborative learning: autonomy, capacity for organization, discipline and group decision making.

- Teaching media that are used and if it favors a motivating environment that benefits the professional interdisciplinary techno-research link (observation of the work in the virtual classroom of the Moodle platform).
- Type of teaching-learning situations, if one starts from a problem that has to be real, authentic, and eminently practical, through ICT.
- Modes of organization that are used and if the interaction centered on the exchange and creation of ideas is encouraged, the interaction between students and between teacher and students to receive feedback from the process and between students for the coordination of problem solving activities, analysis, etc.
- Strategies applied in the training process and if the construction of meanings is promoted more than in the acquisition of contents through the virtual classroom.
- Forms of evaluation during the training process.

The following were considered as essential indicators of analysis

- Knowledge about ICT and its importance for professional training.
- Knowledge about the virtual classroom of the career and its most used applications.
- Knowledge about the interactive platform of ESPOCH.
- Teaching by teachers of interdisciplinarity and the use of ICT in research training.

RESULTS AND DISCUSSION

Analysis of the results. Qualitative assessments

The survey was applied to 28 professors of the Ecotourism Engineering degree in the course 2013 - 2014.

A first analysis showed that 93% of the respondents have basic knowledge about ICT, of this percentage 61.54%, has an average skill level in the use of ICT, 26.92% have a high level and 11.54% have a low level .

35% used the interactive platform of the ESPOCH for consultations and electronic tutoring of subject topics, 32% use it to perform the evaluations for their students, 27% located the materials in digital format so that their students have access to the information, and barely 6% held discussions on topics of interest to the profession (between the teacher and their students, as a result), through forums, chats, blogs, wikis located in their virtual classroom.

Regarding the use of technological resources, 37% of teachers used them for communication with other teachers and other students for research purposes; 21% made an exchange of scientific contents; 24% carried out joint research works and 18% collaborated in research projects and works.

When inquiring about the virtual communities, 79% of the professors raised to know what they are the same. Of this percentage, 9% have a low level of knowledge, 64% a medium level and 23% a high level.

About the level of participation in a virtual community, 67.86% confirmed their collaboration through forums and chats with an average level of contribution.

During the training process of the race, 40% of teachers used audiovisual media; 31% use ICT; 26% use informative media and only 3% assign it for field work.
When finding out if teachers use ICT in the training process, promoting collaborative work, it was revealed that 20% use them, but not to establish this type of work, having an average level of knowledge.

Although 82% carried out activities related to the development of projects on the subjects of the degree, they did not participate in the elaboration of collaborative projects.

30% of them have an individual bank of research topics, related to problems of the profession, some for the interest of giving continuity to a research carried out, others for their own initiative and for their connection to a research project, for consideration by the students through the virtual environment.

They declared their interest in sharing topics as speakers, citing the following: tourism, ecosystems, biodiversity, environmental issues, statistical data analysis, experimental design, linear programming, early warnings, tourism marketing, feasibility of tourism businesses, mathematical models and mathematical application to the race, web data repositories, dynamic documents, quality, quality and planning certification, corporate responsibility, design and curricular evaluation, tourism and culture, representation system, cultural heritage, archeology of Ecuador and history.

37% expressed interest in receiving training in the development of multimedia products; 24% learn the use of free applications, another 24% prefer writing for the weblog and 15% have a particular interest in social networks.

268 surveys were conducted to the students of the Ecotourism Engineering career of the ESPOCH, distributed in the nine semesters, as follows fig.1:

Semester	Student	%
1^{O}	58	21.64%
2^{O}	15	5.60%
3^{O}	47	17.54%
4^{O}	6	2.24%
5^{O}	37	13.81%
6^{O}	25	9.33%
7^{O}	13	4.85%
8^{O}	40	14.93%
9^{O}	27	10.07%
Total	268	100%

Fig.1: Surveys to the students of the career in Ecotourism Engineering of the ESPOCH, distributed in the nine semesters

The survey carried out on students, revealed the following

The students of the Ecotourism Engineering career have an excellent motivation and willingness to assume ICT in their training process, recognizing, like teachers, the enormous possibilities that they can offer them in the

development of their profession, highlighting the facilities that these provide, fundamentally in terms of the rapid search for information and interpersonal communication.
Students are unable to develop independent work skills related to the search, selection, organization and processing of scientific and technical information related to the profession, through the use of ICT during the process of scientific research associated with the completion of their thesis, for the culmination of university studies.

Likewise, teachers do not make an initial diagnosis that allows them to know the main deficiencies, potentialities, knowledge and previous skills that their students have, to undertake the research process for the development of their thesis.

Many professors do not optimally take advantage of the facilities offered by computer networks and in particular the Internet, in the search for up-to-date and varied bibliographic materials that contribute to the enrichment of possible research topics to be undertaken by their students, to stimulate them and motivate them to investigate and thus awaken in these his "intellectual curiosity".

Research topics are somewhat rigid (sometimes repeated from previous courses), undermining the possibility of new research in which students develop their initiatives and their creativity as well as responses of social impact at the local, regional and national levels.

There are limitations (both students and teachers) in efficiently exploiting the possibilities offered by ICT for communication (both nationally or outside the country), with other students, teachers, professionals in Ecotourism, Forestry and Agronomy or related, with views to establish relations of exchange and collaboration with these, which limits their possibilities to acquire and transmit new knowledge about their profession, develop joint research projects, disseminate national and international scientific works and events, among other aspects.

In summary, the object of analysis and starting point of the research works that are oriented to students, do not take into account the real problems of the profession present in social practice, so that these do not have a real meaning and sense for them, developing by them as an additional evaluative work, which evidences an insufficient relation of the careers of the Natural Resources Faculty of the ESPOCH, with the possible employers' organizations of the graduates. This is a reflection of the limited link that currently exists between the academic, labor and research components of the training process for professionals.

According to the above, the teacher should raise the problems related to professional training to the students so that through the solution of these, the latter develop skills in which they combine theory and practice, which would encourage the development of scientific research.

It is considered essential that the teacher has an excellent preparation in their subject, and that has a general knowledge of the other disciplines, in order to establish interdisciplinary links that allow students to have an integrating vision of their reality.

Despite the prevalence of experts, procedures and instruments in the disciplines, interdisciplinary research that addresses social issues in their integral dimensions becomes indispensable.The observation of the training process of the race revealed that (fig.2):

Fig 2 Observation

A restructuring of the roles of the teacher and the students is necessary: the second ones must participate actively in their formation, in a self-regulated and autonomous way; The first one must create the necessary training conditions in order to facilitate it.

In the dynamics of the training process there is a predominance of traditionalist teaching; low articulation of the contents offered with the specific academic contents of each discipline.

There is no evidence of actions aimed at the development of research activity with support in ICTs and much less characterized by an integrating and articulating approach to research from different disciplines, which indicates the need to work on them.

There is a deep divorce between the high institutional technological development and the insufficient technological culture of its faculty to confront it, which does not give an accurate answer to the training process that develops in the career.

Teachers use traditional investigative methods, leaving aside the use of technology. In this regard, it is a faculty that is neither prepared nor technologically, nor scientifically, nor pedagogically to face research from an interdisciplinary approach, relying on ICT.

The faculty has a very fragmented education, without a comprehensive vision of science and disciplines, to undertake the process of scientific research, as required by these times.

No projects that integrate several disciplines and use technology.

It has been observed that in practice there are limitations to apply interdisciplinarity, since, still, a traditionalist scheme is maintained, with the use of ICT, only as informative media and not as a way to develop collaborative work.The situation presented above has highlighted the need to improve the process of dynamics of interdisciplinary research in engineering career in

ecotourism, taking into consideration the efficient use of ICT in this process, with a view to achieving there from, training of a professional with a good performance in these technologies, according to the demands of the current times, which presupposes:

- Achieve that the process of culmination of university studies has an active and integrating character, which means the development of interdisciplinary projects that have the purpose to solve a common problem of social interest.
- Efficiently use the possibilities offered by ICTs for the formation of academic / scientific communities in the network, which integrate different people: students, professors, researchers, specialists in a certain branch of knowledge in the development of common investigations, in order to avoid duplication of efforts and results
- Exploit the facilities of the virtual classroom of the race (supported on the Moodle platform) to exchange information, share resources, ideas and experiences.
- Achieve more dynamic virtual environments that foster collaboration among teachers, students and other participants in the process, based on the efficient use of the possibilities offered by ICTs in the development of the research activity of the students of the career, which should encourage them to bring to the process real problems of the profession that the Ecotourism Engineers have to face, in their jobs, once graduated.

CONCLUSIONS

The diagnosis of the current state of the interdisciplinary research training with the use of ICT and its dynamics, in the Ecotourism Engineering career of the Faculty of Natural Resources in the ESPOCH, allowed to corroborate the limitations that subsist in this process that are based on the limited use of these technologies for the development of a collaborative work via a network between disciplines, which enhances the research activity of students, in accordance with current social demands.

The results obtained account for the need to innovate in the dynamics of interdisciplinary research training with the use of ICT in the Ecotourism Engineering career, for which it is pertinent to elaborate theoretical and methodological proposals that explain this dynamic from an integrating logic of the investigative, interdisciplinary and technological processes that comprise it and instruments that facilitate its improvement.

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