

Students' Perceptions about educational model and their ICT competencies.

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Abstract— The objective is to describe the students' perception in the area of computer science about knowledge and competencies acquired as well as required information in Information and Communications Technology (ICT). The research was mixed: qualitative and quantitative. Computer Science students of the Veracruzana University in Mexico were selected. In general, Students consider that they have basic knowledge and they manifest that require specialized training. Also, they believe the educational model have been allowed to develop self-learning capacity, but their interest in learning and performance depends on the teacher's requirements, highlighting his immaturity and low commitment in the efficient realization of their studies.

Keywords— Competencies, ICT, Students, College, Mexico.

I. Introduction

Information society demands a revolution in content, forms and methods of teaching in all areas of knowledge, in all occupations and professions [1]. In this sense, University plays a relevant role to confront the challenge to acquire competencies in the use of ICT in the diffusion and perfection of e-learning between all actors who are involved in the diffusion of educational content to the teachers, as the development of knowledge and skills, in handling technological tools, in the development of the technological expertise of university students.

In the Mexican context, many public universities have adopted their teaching model in competencies development. One example is the Veracruzana University that has adapted its degrees to foment the developed of skills and dexterities in the use of office tools in the common area of all of its degrees. The purpose is to develop a minimum ITC competencies level in all the students.

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The process of incorporation of the ICT in the Veracruzana University is consolidated since 1997 with the project called Flexible Integral Formation which was presented to improve the college (FOMES) in spanish, and became the formation of Flexible Integral Educational Model in Spanish MEIF (Modelo Educativo Integral Flexible) [2][3][4].

The domain in the use of ICT is expressed in the Generic Competencies which are applicable to all the degrees offered by the university. Specially, the degree of Computer Science becomes one of the most important representatives in development of competencies related to the extensive use of ICT.

In this sense, the purpose of this paper is to describe the perception of university students of the Computer Science degree in the Veracruzana University.

II. Development of ICT competencies in college

In order to have a common meaning, this discussion suggests the meaning of competencies, for Fuentes [5] is "A set of knowledge, abilities, attitudes and values needed for the effective performance of an occupation or a productive function".

This definition involves observable behaviors that contribute to the success of a job [6], and involves knowing, and know how to transfer [7]. Relating this concept with ICT competencies, can be established that the last ones form a group of abilities, knowledge and attitudes applied to the use of information and communication systems, as well as equipment that activity involves and according to NETS for Students [8], what learners should know and be able to learn and effectively transfer, in order to live productively in a digital world.

ICT competencies can be classified as: a) Basic competencies of literacy digital that relate to the use of ICT in classroom activities and presentations, involves the application of digital tools to obtain information and the use and development of materials using different sources online; b) Application competencies that are associated with the use of skills and knowledge to create and manage complex projects, solve problems in real-world situations, collaborate with others and make use of networks access to information and experts; c) Ethics competencies, when a person understands and shows the ethical use, legal and responsible use of ICT [9].

In an academic environment of university education, the process involves teachers, students and the institution, the last one will have to provide the methods to achieve the learning objectives for students. According to UNESCO [9], teachers

need to cover certain standards about competencies: 1) IT instrumental competencies; 2) Competencies of the educational use of technology; 3) Competencies about virtual teaching; 4) Sociocultural Competencies; 5) Communication competencies through ICT.

In today's world, the relevance of ICT is emphasized, their value is underlined in all countries, included members of Organization for Economic Cooperation and Development (OCDE) [10]. Also authors like Littlejohn, Margaryan and Vojt consider the development of digital literacy in students can be an essential aspect to confront with technological and social changes that are happening in the world.

According to Espinoza [12], in the last ten years the documents and institutional reports of the Mexican public universities, contain direct references to the adoption of ICT and development or promotion of use, in forms of transmission of knowledge of that degree, and support for students and teachers of the institution to increase the use of technologies. However studies have focused about the perspective of teachers, therefore in this study focuses on the impressions that the students have.

Nonetheless, related studies of ICT use by Mexican university students were detected, linked mainly to the interaction with others and for recreation, over the academic purposes [2][3][4][12][13][14]. Therefore, these researchers detected a low use of ICT and the internet to support their own learning process.

Concerning, in the last report of tuning project for Latin America was determined that the domain of ICT and their applications in the workplace must be one of the generic competencies of all graduates students in the region [15]. In this sense is important to identify the beliefs, values and perceptions of college students about their: ICT training needs, confidence in their ICT knowledge, level of commitment in their studies, as well as the role of ICT in their professional preparation.

III. Methodology

The objective of the study was to describe the perception of students in the area of computer systems in terms of knowledge and skills acquired as well as the training required in ICT in the in the area of Flexible Integral Educational Model (MEIF) to identify the level of disciplinary aptitude when they are next to be close to entering in the workplace. The specific objectives were: (1) ICT training needs of college student; (2) Identify the level of confidence in their ICT knowledge to be close to entering in the workplace; (3) Evaluate the level of commitment of students in their academic performance; (4) Describe the role of ICT in vocational training.

The selection criteria of the sample was the Computer Science degree in the Veracruzana University. That educative program has a disciplinary technical and administrative context and is characterized by an average index in the use of ICT. This degrees is taught in the five regions. However, only three of these regions (Xalapa, Veracruz-Boca del Rio, Orizaba-Córdoba) were considered because only these

accumulate a history of more than a decade and have many graduates, have a total of 1200 students.

The type of study was mixed: quantitative and qualitative. However in this study only the qualitative part will be addressed. The tool used were discussion groups to students belonging to the seventh semester of the degree of Computer Science. In total, 40 students, 20 females and 20 males participated in five discussion groups: 2 in Veracruz, 2 in Orizaba and 1 in Xalapa.

The qualitative instrument used in the discussion groups was composed of questions covering aspects about: level of student's commitment, importance of classes, confidence in their ICT abilities, and use of ICT in their academic work and the role of ICT.

IV. Results

The perception of university students about the process of incorporating ICT becomes an indirect element in determining the level of development of ICT competencies for both of their subject areas, basic and disciplinary. They also help to determinate the student perspective about ICT competencies of their teachers.

According to Peirano and Dominguez [16], ICT competencies of teachers are a key element to generate plans of educational computing oriented to maximize the skills and knowledge of students. This aspect is particularly relevant in an Educational Model (MEIF) which is based on the use of ICT as a mechanism for the development of the formation of the student.

Nonetheless, is a clear correlation between the consolidations of ICT competencies of teachers with ensuring the development of such competencies in university students [2][3][4]. However, the evidence presented denote the important role that take the pedagogical training of teachers, in terms not only of how they can incorporate ICT and the respective instructional design, Also you must take note about the change of traditional teaching to interactive schemes that promote student participation in class and have an extra dose of permanent motivation to learn.

In Table 1 are indicated preferences about how they would like to operate the educational model and contrasted with the main remarks about their perceptions regarding the development of ICT competencies for each dimensions of the study.

TABLE I. ANALYTICAL SUMMARY OF PERCEPTION OF STUDENTS

Dimension	Preferences	Perception
Confidence in their ICT knowledge	<ul style="list-style-type: none"> • Increase in classroom practice. • They concentrate on pass the subjects and not "learn" as required. 	<ul style="list-style-type: none"> • Consider that they have not acquired sufficient knowledge. • They fear not living up than its competitors
ICT training needs	<ul style="list-style-type: none"> • Focusing on the use of disciplinary tools. • They request best and most updated technology to realize exercises. 	<ul style="list-style-type: none"> • They believe they have acquired a basic level of training and require increase their level of technical expertise.

Level of commitment of students	<ul style="list-style-type: none"> Require multiple efforts motivation and pressure from their teachers. Demand calm classes, demanding teachers and variety of practices throughout the course. 	<ul style="list-style-type: none"> Emphasize that their level of commitment varies depending on the subject and how the teacher is.
Role of ICT	<ul style="list-style-type: none"> They are supported by ICT as a means to organize themselves better. They request that the use of ICT is implemented in all their subjects. Recognize the role of the teacher in the classroom is vital and can't be replaced by technology. 	<ul style="list-style-type: none"> They are agree with a type of education supported by the use of ICT They manifest satisfaction in online courses and appropriate use of ICT in the classroom.

Now, in Table 2 the dimensions of the study with respect to MEIF skills detected in field work performed are contrasted. The level of skills is measured with an N (None), L (Low), M (Moderate), and H (High). Estimates based on the perceptions of students participants values are shown in the table.

TABLE II. DIMENSIONS OF STUDY VS PERCEPTIONS OF MEIF ABILITIES

Dimension	Confidence in their ICT knowledge	ICT training needs	Level of commitment of students	Role of ICT
Permanent learning	H	H	L	H
Autonomous Development	L	L	L	H
Teamwork	L	L	M	H
Different audiences Communication	L	L	L	H
Creativity	L	L	M	M
Knowledge Innovation Production	L	L	L	L
Technology Development	L	L	L	H
Problem solving abilities	L	L	M	M

In relation to the suggested skill of the graduate student about permanent learning, commissioned to support the growing trend to research, teaching and interdisciplinary learning as a key in the development of people, evidences denote that there is a recognition and some progress in the development of the ability of learning to learn.

However, the high technological disciplinary profile of the selected educational program reflects that the ability of self-development in students of the seventh semester is not sufficient and required adjustments about teaching techniques and certification of teachers in disciplinary aspects.

The teaching technique most commonly used in this degree is related to the implementation of projects in teams, turning into a relaxed place for teachers but harmful to the students for the lack of individual commitment, bad habits of dependence

in partners and their feeling of insecurity to perform technical tasks individually.

The ability of students on communication in different audiences in the context of ICT use in the realization of activities and tasks, the students showed low utilization of the educational program in question, expressed its use only in recreational and entertainment activities and social networks, and sporadically in supporting the teaching-learning process.

Graduate profile of this degree is characterized by a high sense of creativity in implementing solutions mediated by technology. In this sense, students considered low building in developing the skill of creativity in part by custom to traditional teaching method based on the oral presentation.

Other skills that students should have is related with innovation in the production of knowledge, this is established as the appearance of lower valuation under the actions done by the majority of teachers have focused on the diffusion of theoretical aspects and less on generating knowledge from practical activities.

The feeling of uneasiness in their ability to develop technology is reflected in the level of insecurity expressed about their ICT knowledge and their need for specialized certifications in accordance to the graduate profile. However, this is in contrast with the wide recognition in terms of the important role of ICT in the teaching-learning process.

Regarding skill in solving problems, students adopted two positions, those who felt enough independently of the role played by their academic training and on the other hand, those who are less than a year of graduating and felt they had wasted their time for their lack of commitment to learning and maximize throughout their stay in college.

In terms of the support that the university has given to acquire knowledge of information technologies there was no consensus, for some people Veracruzana University has provided them enough to perform their activities but others point out that the knowledge acquired is insufficient. Apparently it all depends of the teacher who has taught them, interest and professionalism in their teaching activities and teaching methods they employ. Specifically for Computer Basics subject, most of the students agreed that they learned enough. However, when we speak of disciplinary subjects related to the domain of programming tools, many students believe that the knowledge acquired are basic and insufficient. For example: "...I think the university provides basic knowledge of each of the subjects but maybe for lack of time in the course or because there's no classes and all that could affect us, also I think we just got the minimum knowledge about it" (Adriana-Orizaba).

Although most students show the debt by the university toward them minority - have argued that they have attitudes and sufficient capacity to deal with various situations and do not complain about what they have received: "... I feel that if I have the ability to face the problems that arise me, and I am a person who if does not know something, do not keep the doubt, if not have anyone to ask, I start to get into the subject ... and do not stop until I understand it" (Mercedes-Orizaba). This indicates the importance of maintaining a positive

attitude both, by students and teachers in terms of doing the job the best they can, with the resources they count.

In brief, is an administrative technical degree is not oriented to rely on the use of ICT in the teaching-learning process. Even disciplinary teachers are oriented to teach theoretical knowledge with practical work and only sometimes, there is some support technology platform in the teaching-learning process. The dominant model has a great responsibility in students to acquire the necessary technical knowledge and there is not the ease of obtaining technical certifications in all regions of the university that are so treasured in this type of degrees.

v. Conclusions

The development of ICT skills in university students is a complex process that separates much of the simple teaching and accreditation of courses related to the domain of technological tools. It is characterized by the generation of new educational practices based on the design of educational models. However, the emergence of these models are dynamic and require a continuous measurement process to make the relevant adjustments or migration to new educational perspectives.

In this sense, the implementation of MEIF at the Veracruzana University contemplates at least two ways of qualitative form: the perception of teachers and students. On the other hand college students indicate the teacher as the focus of the teaching-learning process and place it as the primary element of acquiring knowledge in their subjects. Meanwhile, teachers believe that their role is to act as a guide in the search and assimilation of knowledge process. So keeping a balance in the teaching-learning depends on a thin line may incur a non-sporadic break when there is a failure in any part.

Although the selected degree involve an appropriate niche for extensive and intensive use of ICT in each of the subjects; to date there is little significant presence of its use, expressed as: elective or optional subjects offered online; numbered academics who are supported on ICT as a resource in the teaching-learning process; and disciplinary subjects that require learning new technological tools as a required skill to develop, but not as a source of support in terms of knowledge that students must acquire [3].

The seriousness with which the traditional method is used and still prevails despite the implementation of a new educational model. Note that happened at least a decade since it began the process of implementing this model in university study, which reveals the level of slowness and lag between discourse and actual results [2][3][4].

Some of the factors involved in this lag towards the development of ICT skills are associated with: generation divide of teachers, lack of ICT competencies on teachers, weakness in the design of the mediated subjects with the use of technology, attitude of apathy about learning in students, as well as the lack of commitment of the students in completing their professional studies in a timely and efficient manner.

Therefore, a process of educational innovation should consider the active participation of all actors for proper assimilation between the implementation of appropriate educational practices that are implemented by teachers properly trained both in teacher training and the technological side making continuous efforts monitoring and motivation in their students to promote the guidelines of UNESCO and longed by MEIF as: permanent learning, self-development, teamwork, communication with diverse audiences, creativity and innovation in the production of knowledge and the development of technology, skills in problem solving, development of entrepreneurship, social sensitivity and understanding of different cultures.

The results obtained in this study are in the same direction as the findings of Silva [17] in relation to the challenge at public universities with technological educational programs, consists in overcoming the strong tendency to focus on the transmission of knowledge, to looking for their integration with skills and attitudes in the person's ability to effectively confront to situations of different areas of your life.

Knowing that the road ahead is long in many Mexican public universities, it is worthwhile to remember that the process of incorporating ICT in educational models can not address it as a purely technological problem, but as a component of human development, social and educational like imposing the goal of democratizing access and the relevance of generation of knowledge.

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