INSTITUTIONAL MANAGEMENT FOR DIGITAL LITERACY OF THE UNIVERSITY

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ABSTRACT

This paper presents a proposal for institutional management for digital literacy of university teachers, carried out from the results of documentary research on the status of the Autonomous University of Chiapas on public and institutional policies to integrate information and communication technologies to raise the quality of education.

This model is complemented with the results of a second empirical investigation on professors from the institution about their knowledge, skills and assessment of technology in their classrooms, and a response to comments and suggestions for their improvement.

Keywords: *Digital literacy, university teachers, higher education institution, information and communication technologies (ICT)*

The route to generate this proposal was made from two previous investigations: the balance of managing the integration of information and communications technology (ICT) at the Autonomous University of Chiapas (UNACH) and a diagnosis of knowledge and skills of UNACH faculty about ICT and its impact on educational practice, which were registered with the General Direction for Research and Graduate Studies of this institution. This framework provides the tools to form a model of digital literacy to university professors that proposes a project management from a conceptual and empirical approach, placed in the context of higher education in Mexico, but above all, with the knowledge of the UNACH vision and its actors on the integration of ICT in their academic processes.

Through the first investigation, it appears that this vision is linked to the recommendations on the quality of education issued by international and national bodies, which implies the finding of relevance and equity of opportunity for all Mexicans.

The UNESCO (United Nations Educational, Scientific and Cultural Organization [UNESCO], 1998) refers to it as the adequacy of being and doing of higher education- it is their duty. Quality, then, is a dynamic concept that integrates its particularities according to local, regional, national and international contexts, which in turn is formed as a product of agreements between actors, environments and institutional projects, and values and visions that guide their activities. It is, therefore, an important point of reference for higher education institutions (HEIs) to conduct their substantive and adjective functions in order to make progress in fulfilling its social purpose.

From this perspective, each institution should seek ways to socially construct their own concept and quality model that they can apply, which not necessarily needs to be useful for other organizations with different or even equivalent missions, because the context determines the collective project that it has to take as a social body.

There are differences in the concept of quality according to the approaches of interpretive currents in education. Thus, for humanists it is "the development of the capacities of learners to construct meaning and make sense of what they learn" being the teacher as a mediator in the process. Behaviorists, however, believe that the teacher "directs learning, controlling stimuli and responses , " while critics seek the contribution to social change (UNESCO, 2007, p. 25). These approaches are still valid and are faced in academic debates on policy and pedagogical practices.

In 2001, UNESCO issued the Universal Declaration on Cultural Diversity, which explicitly presents itself as one of the main thrusts of action plans to improve the quality of education,

> *"promoting 'digital literacy "and ensuring greater mastery of the new technologies of information and communication, to be considered at the same time educational disciplines and as pedagogical tools capable of enhancing the effectiveness of educational services. (UNESCO, 2001, Annex II, 10)".*

A preparatory meeting for the World Summit on the Information Society, the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), in Bavaro, Dominican Republic took place in January 2003. As a result of the The "Declaration of Bavaro" , it was formulated as one of the priority topics:

> *"Emphasizing the education of key technologies of information and communication, including but not limited to teachers, civil servants, doctors, nurses and community leaders users. Incentives should be established to encourage adaptation to new forms of communication and interaction. It is necessary that countries must endeavor to minimize the common problem of 'skills mismatch', by actively seeking out suitable professional profiles and constantly updating textbooks. (ECLAC, 2003, Priorities, 11)".*

This is the trigger to strengthen efforts to promote, from public action in all areas, the acquisition of basic knowledge in ICT, especially from the ministries of culture in several countries in Latin America, (Silvera, 2005) and in the case of Mexico, from the Ministry of Public Education (SEP).

DIGITAL LITERACY AS PART OF IMPROVING EDUCATIONAL QUALITY

Education faces significant challenges right now, one of them has to do with those arising from the so - called *knowledge society* which poses new social, economic and cultural scenarios.

These challenges involve reorganizing the way we think and interact with the environment, which certainly involves a process of *audiovisual, digital, informational* or *technological literacy*, allowing learning to read and write in a new language, "know how to read technology and audiovisual media, (...) and know how to write and communicate with it "(Prats, 2005, fig 3) as part of a new process of improvement of cognitive, emotional and social abilities of man. UNESCO sees literacy as:

> *"Diverse practices embedded in socioeconomic, political, cultural and linguistic contexts, acquired in and out of school, also involves the context of family and community, the media through various technologies, skills to continue learning, the world of work and life in general. (UNESCO, 2009, quoted in Vega, 2011, p. 3)"*

The inclusion of technologies in this definition is particularly noted, which contextualized in education systems could be complemented by

> *"mastering lots of skills, behaviors and ways of thinking associated with a context that allows people to use proper procedures to deal critically with*

any text, appreciate and improve it to the extent possible, whatever the present medium . (Garzón, 2015, p. 28)".

The *digital* adjective refers not only to the skills to use the Internet, but also to use *hypertext* documents. According Gilster (1997, cited in Gomez Licea, 2002, p. 4) "one who is literate, is able to assess Internet, not only from the point of view of medium for communication, publication and dissemination, but also as a resource to get information and use it".

This statement is effective in studies like Gallardo-Echenique *et al* (2015) which mentioned that the knowledge society requires educated citizens able to access, evaluate, organize, interpret and disseminate information in various digital formats through any kind of technology.

UNESCO (2011) frames this need in the field of higher education, annotating that teaching competence is required in the basic knowledge of digital technology, communication tools, the use of a wide range of texts to express ideas through diverse media and to search for information and understanding of the purposes of young people in the use of Internet.

The recognition of the collaborative nature of these forms of reading and writing allows the creation and interpretation of existing texts in various social contexts, conditioned by their own realities, where not only skills or specific skills to meet the world through technologies is required, but to know how to read with new eyes, values and attitudes.

STUDIES ON DIGITAL LITERACY IN MEXICAN IES

Institutions of higher education have worked in the innovation of processes and educational programs in order to improve quality, such as the systematic training of their teachers, the design and implementation of new educational models based on theories

and new pedagogical techniques, including new training options, areas of expertise, flexibility and curricular updating, introduction of compulsory language and computer courses with the latest technology in its educational programs, the development of mechanisms to facilitate the mobility of students and diversification of degree options .

In North America, some countries in Europe and even in Latin American countries like Chile, Colombia, Brazil and Argentina that have national digital literacy programs, have conducted extensive research on the academic use of ICT in higher education institutions (Silvera, 2005), but not in Mexico, where there are only isolated studies related to the use of ICT for teachers, or in particular a tool to support learning such as collaborative online environments for authoring texts.

UNESCO (2011) refers to the importance of conducting research projects and hypermedia literacy in countries around the world, however, we refer only to Latin American countries that have national digital literacy programs within the framework proposed in this document.

For purposes of contrasting results of observations of the diagnosis of teachers of the UNACH, research has been conducted in Mexico, such as *Digital literacy of teachers at the University of Guadalajara*, by Carmen Rodriguez and Ruth Padilla in 2007 were reviewed; *Diagnosis on access, use and appropriation of ICT in the UNAM*, Delia Crovi; . and Luz Maria Garay, and *Access, use and appropriation of ICTs among the teaching staff of the UPN Ajusco*, published in 2008. In 2009, there came to light: *Teaching and ICT in higher education: the central role of didactic teacher conception*, by Dr. Alma Beatriz Rivera who worked at the Universidad Iberoamericana, and *Knowledge and teaching skills in ICT teachers in the Bachelor of Science in Education*, by the teachers of the Technological Institute of Sonora- Alma Villa, Ana Argüelles and Lourdes Acosta.

The most recent publication of research results in this framework, dating back to 2013 with article Lopez de la Madrid and Chavez, *The training of university teachers in the application of ICT*, conducted with faculty of the Autonomous University of Sinaloa.

Of these, the Iberoamericana University is distinguished by its character of a private higher education institution, in addition, the research approach is qualitative and uses Grounded Theory as the methodology of data collection and analysis. Other studies correspond to public higher education institutions where the methodology was the application of diagnostic questionnaires among teachers.

Of all the studies it can be concluded, first, that the vast majority of teachers have available at least one computer at home or at the workplace; second, that most teachers make use of ICT tools with focuses on research, teaching and outreach; third, the tools used are e - mail, general Web pages and institutional portals; Fourth, there is a high percentage of a lack of exclusive means of educational technology, with almost no development of it.

The self - perception of the specific skills that teachers attributed to ICT is presented at high levels and attitudes towards the use of technology in classrooms are also mostly positive. Teacher appreciation is observed as a general trend to the results that a greater knowledge and use of ICT indicates better learning, a better way of teaching, and for research collaboration.

Other interesting indicators in the reviewed studies is that the type of appointment (contract) does not affect usage levels or skills, although there are significant differences among teachers according to area of knowledge in which classes are taught. In the case of the UNACH, it must work on the equalization of opportunities for access to technology, which are not the same at all campuses, as major differences present themselves in the use of technology and teacher training, what impacts the valuation of

their personal, professional and teaching practice, and use and attitudes about their impact on teaching / learning.

The findings of all of the studies points to the need for the necessary institutional infrastructure to strengthen the pedagogical use of ICT, in addition to the general request to include training programs in order to develop skills in handling technologies for teaching and strengthening of the curriculum to involve learning strategies that include them .

This suggests the need to program specific objectives for the promotion of ICTs within universities as part of a strategic plan to promote the quality of education and the use of investment in renovation or upgrading of infrastructure.

Generally, teachers have a positive perception of their training in ICT, reinforcing the idea of the development of digital literacy. However, beyond the acquisition of skills in handling technologies, it will be important that training programs include daily exercise in their educational practice, knowledge, abilities, skills and experience gained by teachers with immediate use of ICT for the benefit of university.

This training process personally allows teachers to generate self - learning provisions, as opposed to a teacher who, interested in ICT training, is required for each innovation that technologies offer.

It is considered important to mention that in Mexico there is a study which extended the use of technology by teachers of higher education systems. In fact, research referenced in this section is the only ones to date on digital literacy. As said before, there are isolated studies on their use and technological training, however, the concept of digital literacy referred to in this article implies indicators that have not been contemplated, making it impossible to think about standardizing variables .

At the international level, there is currently work on an empirical investigation that aims to determine the degree of digital literacy of teachers of higher education in the countries of Peru,

Colombia, Costa Rica, Spain and Mexico, which will be able to be shared once results emerge.

THE AUTONOMOUS UNIVERSITY OF CHIAPAS TODAY

The UNACH is the main institution of higher education in the Mexican state of Chiapas. It serves more than twenty one thousand five hundred students, has 63 undergraduate programs , 8 Unconventional (remote) programs and 50 graduate programs spread over nine campuses and two headquarters of the Virtual University in eight of the nine regions of the state, attended by 25 academic departments. 78% of students are enrolled in quality programs, 18% have scholarships and 94% have optional insurance (UNACH, 2015).

The institution has the recognition of the SEP for its quality, and it has 46 programs at level 1 of the Inter - institutional Committees for the Evaluation of Higher Education (CIEES) and 14 accredited programs by the Council for Accreditation of Higher Education Programs (COPAES).

The academic ability of the university is made up of 2,149 professors and researchers, 919 of whom are full time. Of these, 72.3% have graduate studies and 46.7% have the recognition of the Professional Development Program for Teachers (PRODEP) profile. The institution has 70 faculty members of the National System of Researchers and 119 of the State System of Researchers. The academic staff is organized into 65 Academic Bodies of which 62% are in the *bound* and *consolidation* levels (UNACH, 2015).

The Virtual University was founded in the year 2006 in order to expand the coverage of higher education and continuing education, and began its work with programs and associated professional degrees. At present, two degrees and a master ‘s program serving 304 students are offered. They have also trained more than 80% of university professors and 200 doctors of the

Mexican Social Security Institute for the use of virtual learning environments and ICT. The institution recently joined the Common Higher Distance Education [1] (ECOESAD).

Teacher Linking Units (*Unidades de Vinculacion Docente, UVD*) perform the vital function of merging institutional goals with social and professional goals and demands in the region , and are based on the principles of relevance, while allowing the articulation of the basic functions of the university with situated learning in real contexts . Some of them, through academic bodies and students of educational programs related to information technology, have conducted research relating to the use of ICT for the economic development of indigenous communities.

The UNACH (2007), in its *Institutional Development Plan 2018* takes up the challenge to integrate and optimize the application, use and consumption of ICT to their activities and processes, so that it can provide services and educational programs, upgrading, professional improvement, academic advising, scientific and technological culture, promotion of culture and arts, and quality and relevance.

In the 2014-2018 academic project, the UNACH (2015)was inserted into the axis of management and consolidating institutional assessment of the universities physical and technological infrastructure, ensuring their availability to the academic environment.

In educational innovation, it is currently working on creating support centers for the implementation of the new educational model, modernization and expansion of the technological infrastructure and training in new information and communications technology, among other challenges such as consolidation of institutional mentorship program.

1. Consortium that integrates public higher education institutions that offer distance programs.

DIGITAL LITERACY MODEL FOR UNIVERSITY TEACHERS

The Autonomous University of Chiapas maintains at this time a scheme that separates academic computing support missions of teaching, learning and research, and administrative computing that supports the management of the institution itself. Each process is responsible for reporting to the Rector in the first case, and with the Administrative Secretary of the UNACH in the second.

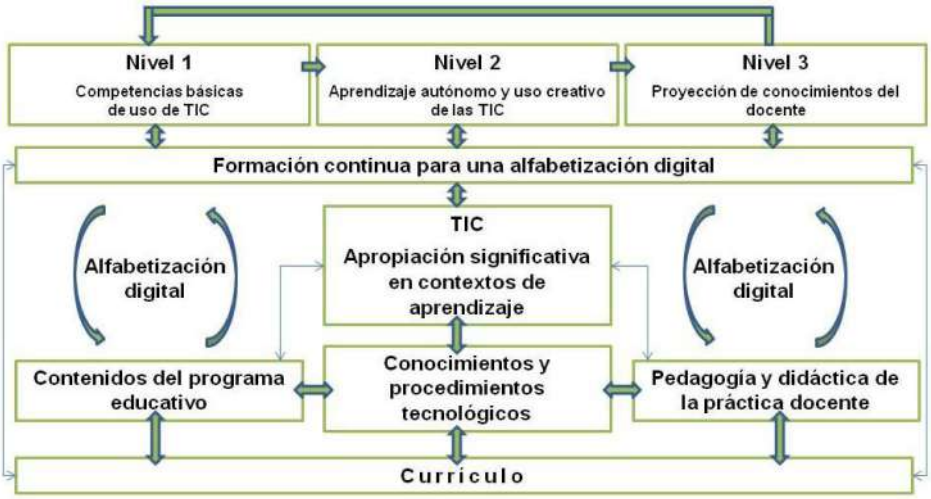
Our research does not proposes a new organizational design to the academic process, but rather suggestions for actions that serve this sector of the institution , allowing for future study in the university on integrated management of ICT .

TRAINING PROGRAMS

From the results, there was a need to design a training scheme of multilevel digital literacy, involving teachers in the same process, so that this "appropriation of ICT" is not only an external matter but is observed to produce its internalization to be the ones who at any given time schedule requirements according to their educational needs.

The professional knowledge of teachers integrates a variety of knowledge: about curriculum content, pedagogy and didactics, within which knowledge and technological field procedures are involved. Thus, teacher training in ICT should include not only knowledge and educational use of tools, but a reflection of their potential, their limitations and their impact on learning in specific contexts, focusing on the goals to the significant appropriation of tools in learning contexts.

Scheme 1. Training programs for digital literacy.



Source: Garzón, 2015, p. 229

As for the university educational model, the absolute inclusion of ICT in the curriculum is transversal, that is, treating them from all disciplines and in different fields of action, rejecting approaches of instrumentation biased towards the uncritical use of resources without articulation with educational objectives, content and context (Perazzo, 2008).

In this process of formation, the development of activities that allow the study of texts in different media or devices is considered, so that teachers reflect on the many forms of representation of information that lead to the construction of knowledge.

Thus, the proposal regarding teacher training includes a first level referral to teachers who demand continuous assistance or guidance to acquire basic skills in the use of learning ICT; a second level for serving teachers who have acquired the ability of autonomous creative learning using ICT in their daily work; a third level to support teachers to project their knowledge among the university community, to generate a new cycle of training, for strengthening digital literacy within the institution.

INSTITUTIONAL ACADEMIC COMPUTER MANAGEMENT

For a model of digital literacy, one must have the right technology which has to operate efficiently with high levels of commitment from institutional managers- the education authorities and those responsible for computer services.

The attitude towards technology means that for those leading a higher education institution it is vitally important to ensure the quality of services and distribution of resources. This facilitates the integration of ICT such as seeking the necessary infrastructure and promoting digital literacy training and organizational actions. The UNACH considers this line from the rectory and through responsible university departments, not only as a measure to give attention to the guidelines of the evaluation bodies, but by the certainty of the opportunities offered by ICTs to achieve proposed management goals .

Gros (2000) tells us about the "the invisible computer" as an overview within education institutions where those who work with computers require it without worrying about the availability of technology, its proper functioning or quality of Internet connectivity. Their flaws, slow Internet access, complexity in the use of platforms or interfaces, produces a digital divide that increases the resistance for their use.

To enable students to assume a new role on the responsibility for their learning in the process of dipping into the knowledge society, it is also necessary to transform the traditional role of the teacher, bringing new educational possibilities of communication and access and dissemination knowledge in all its forms.

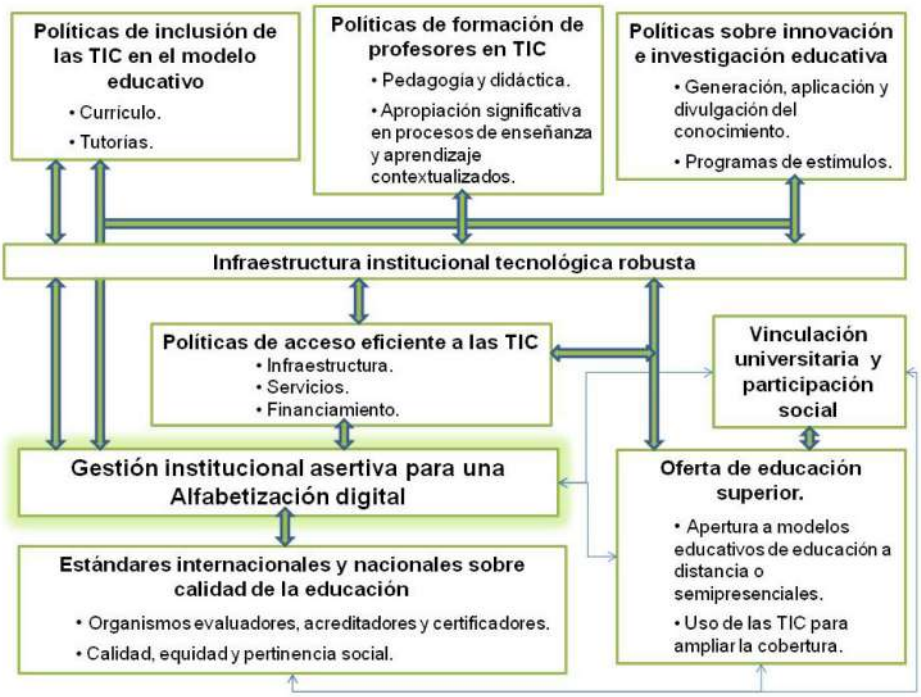
ICT also open up possibilities in the mentoring process that should not be missed. As noted by Marques (2000), communication channels can be much more comfortable to bring teachers with students and even families to enjoy accessible procedures for

negotiations with the agencies or teachers, as well as collaboration with the institution.

The features offered by ICT also allow contact centers with other social institutions: the websites of the institutions provide insight into their activities and telecommunication services enable contact and interaction with people who cannot travel to school at a specific time.

The scheme proposed below summarizes the proposed management level, which is explained in more detail in the following sections, according to their scope: teachers, technology infrastructure, ICT and curriculum.

Scheme 2. Institutional responsibilities for digital literacy



Source: Garzón, 2015, p. 232

Teacher Support

Teachers are the cornerstone of all innovative process in education such as concepts, knowledge organization, and the teaching process which in turn creates opportunities for learning, come from teachers and it is this sector that indicates the direction and priorities of an organization dedicated to education, which is strengthened by its institutional leadership.

It is therefore important that the management of university computer systems includes the choice, application , and integration of infrastructure, policies and services that support teaching / learning supported by ICT.

It is transcendental to provide support services to teachers so that they learn to effectively use the available tools and moderate setbacks that arise when things do not work as expected, with special attention to work on materials dedicated to distance education and online learning.

The demands of time and effort of teachers who design materials for modalities supported by technologies are much greater than those of a classroom course, and they serve as a teaching resource. It is expected that the institution values in its stimulus policies the performance of academic staff regarding these activities.

Technological infrastructure

The integration of ICT in schools has an important base in the availability of infrastructure that the university population and educational programs and resources is provided with a corresponding service for teachers who use them.

The Internet is an important means of access to knowledge and dissemination. Interconnection policies of the centers that integrate the University should be strengthened to add wireless capability to the entire data network, following the trend towards

mobility instruments and multiple accesses (Spicer, 2006). The UNACH has served the convergence of voice, video and data, with appropriate organizational implications of infrastructure and service, as a basic policy that strengthens a better service to the university community.

The secure access to computer services in the institution can establish a gap for the desired digital literacy. It is substantial to propose alternatives to the university community for the acquisition of computers and work towards national indicators of access to technology by students and teachers from their schools. This implies a significant increase in requests for support, resulting in the need to strengthen the care of areas such as the online university and asynchronous systems.

Far from being a service, the university community should view ICT as a strategic element of development, seeking funding under this approach. The impact can be seen as indicators of technological innovation, better learning and new activities of great didactic and pedagogical potential.

ICT in the university curriculum

Until recently, teachers were in a process of hasty integration of ICT in their teaching and were trying to meet the need for training in the field of office automation tools and skills for network access, with short courses detached from the contents of educational programs, completely forgetting the pedagogical use that ICT could have for their professional practice.

In the educational model of the UNACH proposed in the year 2002, ICT are included as strategic tools in all curricula, however, there prevails the formulation of isolated academic units, complementary to the curriculum, addressing knowledge and skills that students should work in a couple of semesters of their university education without making contextualized inclusion in the rest of the courses that make up each program as an option for obtaining

significant learning or acquiring the necessary skills in information for inclusion in the *knowledge society* .

This proposal includes a comprehensive integration of ICT in the curriculum at several levels:

- Literacy or digital: learning, practices and attitudes related to the use of ICT as an important source of access to information or knowledge.
- Application of ICT as a pedagogical resource in the subjects: explicitly promote the programs in the application of ICT with specific functions to assist in the acquisition of the skills required in each course, as a transversal content and professional tool. At the same time promoting the didactic use of ICT to facilitate the teaching/ learning processes.
- Using ICT as cognitive tools for collaborative learning: promoting interaction of the symbolic systems of representation of the knowledge with the cognitive structures of students supported by the technology as tools for the cognitive process of information.

AXLES MODEL. SYNTHESIS

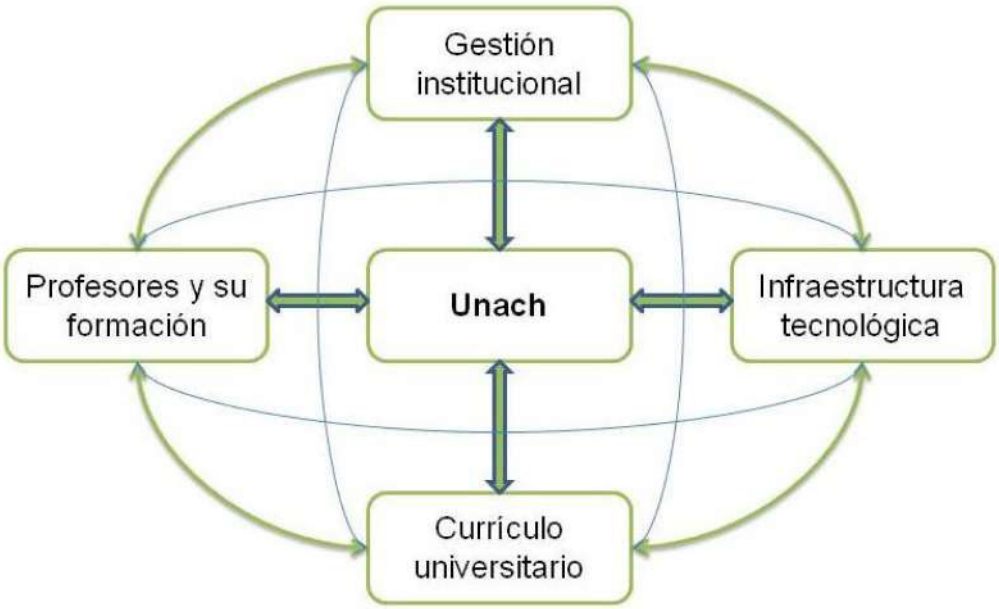
To achieve effective digital literacy of teachers within the institution, the following scheme is proposed.

The institutional management serves the administrative, educational and technical leadership required by the authorities of the institution, to propose the necessary changes in its organizational culture.

The technological infrastructure refers to model resources and support services , where management functions to be performed by those responsible for the computer systems are addressed.

The curriculum includes comprehensive integration of ICT in several levels that allows the university community to learn about ICT.

Scheme 3. Model of digital literacy for teachers UNACH



Source: Garzón, 2015, p. 235

The appearance of teachers and their training, deals with the knowledge and skills of teachers to use ICT in their educational practice, in addition to supporting the process of generating knowledge about their area and in terms of technologies applied to education.

These are the key to effective appropriation of ICT in the teaching process elements.

CONCLUSIONS

ICT changes the schemes; they reorganize structures and change perceptions, while offering opportunities to access new learning through them.

Although teachers have a positive perception of their knowledge and favorable attitude towards technology, training programs in ICT have neglected the context and objectives of integration and use of knowledge in the pedagogical level, as it is located in the instrumental teaching process, it is necessary to have a situation of change to transcend a learning process resulting in the development of a self-learning teacher around ICT, which allows, in turn, transforming its role within the institution and strengthening its link with students.

Higher education institutions have the important challenge of significant incorporation of ICT in their formation processes, not only in the acquisition of infrastructure, but about literacy processes, or re-literacy, considering especially the integration of ICT in the educational experience of teachers at various levels: practical application in the classroom, innovation in processes of knowledge dissemination through electronic means, development of ICT-supported training materials, routine use of knowledge management platforms, participation in academic exchange experiences and contributions to knowledge networks in educational technology.

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