ICT Training Requirements in Higher Education: Case Study of Training Programme for the Didactical Use of Web 2.0 Applications

María Mendieta Baltodano [a]

Abstract: This article describes the proposal of an ICT training programme for the didactical use of Web 2.0 applications for the professoriate at the Multidisciplinary Faculty of Carazo (FAREM-Carazo, *for its Spanish acronym*). The study is approached from a descriptive/interpretive perspective, starting from the findings of diagnostic research which examined the professors´ views about the educational/organizational workings of ICT at the National University of Nicaragua (UNAN-Managua, *for its Spanish acronym*). The results revealed the needs demonstrated by the professoriate regarding ICT training. This led to the design of a training programme structured in three units: (a) ICT in the new context of higher education; (b) online information searches, and; (c) educational applications of Web 2.0, aimed at developing teachers better prepared for the 21st century.

Key-Words: Teacher Education Curriculum, Web 2.0, Training Requirements, Higher Education, Information Search, Applications.

1. Introduction

In today´s society, information and communications technology (ICT) is central to all processes of information and communication, especially those which are of a telematic nature. This is true to such an extent that society in

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[a] Facultad Regional Multidisciplinaria (FAREM), Carazo, UNAN-Managua (Nicaragua). Correspondence: María Mendieta Baltodano, FAREM-Carazo, Universidad Nacional Autónoma de Nicaragua-Managua. De la Rotonda Universitaria 1 km al Sur, Villa Fontana, Managua, Nicaragua. Apartado Postal #663. connymendieta@yahoo.com.

this century has been named "information society", "the online generation", "generation i" (where "i" refers to Internet and/or information), and even "the WhatsApp generation." Or, in the words of professor Manuel Castells (2001), "network society" or "the information age". Or as Echevarría (2000) notes, new technologies allow a new social setting, a third environment, which is clearly distinguishable from natural or urban settings. These profound changes are even more acute in higher education, going from a model centred on the teacher to a model in which the student becomes the principal focus. As noted in the arguments of Segura & Gallardo (2013), in education, the use of technology has marked a before and an after in teaching/learning processes. Such technology has fostered new teaching methodologies, it has established new ways in which the participants of the learning process relate to one another (teachers and students), and it has modified the roles which they take within this process. Del Moral y Villalustre (2012) point out that the technological and didactical capacity of teaching staff is becoming an imperative for coping with new teaching/learning situations developed on virtual platforms with the support of technological tools. Cabero & Gutiérrez (2015) tell us that to use ICT is to rethink the educational institution because it implies a change from theoretical to practical, as affirmed by Soto (2010); one of the big challenges faced by education is, without any doubt, the use of information and communications technology, something which should be considered as a techno-didactical tool for strengthening teachers and, for giving meaning to and redefining knowledge acquired in the daily learning of pupils in an educational context. It is precisely in this new dilemma that ICT coexists as a support tool in the teaching/learning process, generating new environments where teachers must necessarily carry out new functions.

Taking into account the aforementioned factors we coincide with Tascón (2003) in that the utilization of ICT, the management of learning environments, and changes in methodology, demand a change of mentality and training practices. Furthermore, such changes should not be limited to the instructive side of teaching, but should also focus on the new roles of a teacher: (a) to promote an organizational climate; (b) a guide; (c) a motivator; (d) a source of information; (e) to promote the use of ICT; (f) a knowledge transmitter; (g) a person able to evaluate and provide resources to students;(h) a resource creator (design and development); (i) a fellow learner; (j) a tutor; (k) a researcher; and finally (l) a person able to update course content. Furthermore, according to Volman (2005) and Aguaded & Pérez (2007), teachers should take on a more dynamic role as a tutor, a mediator, an adviser, a counsellor, a problem developer, a work group coordinator and, an organiser of experiences.

Such an outlook implies an alarming situation for teaching professionals, who are called upon for innovation in education, precisely because in order to satisfy the educational needs of students in new learning

environments and settings, be they face-to-face, partial-presence, or distance learning; teachers will have to turn to the use of ICT as today´s reality leaves little choice. This situation should be addressed by teacher training institutes in their choice between assuming a leading role in shaping education or being left behind amidst incessant technological change (UNESCO, 2004).Considering this, training for teachers is very important, owing to the large influence and frequent use of ICT in the three elements of learning (knowledge, skill, and attitude), according to the indicators created by Wen & Shih (2008), but it also implies a great challenge. Therefore, updated training in ICT for teachers is a priority, to acquire technological expertise, digital competencies, and positive attitudes which allow the adaptation of their teaching to the demands of the information society, and also as an opportunity to rethink teaching practices on an individual and collective level (Gómez, 2001; Tilve, Gewerc & Álvarez, 2009). It is not enough just to know, but rather, that it is necessary to know in a way which is linked to the profound social and economic changes underway, to new technologies, to new industrial and institutional organization, in a complex and interdependent growing world, which wants people with restless creativity and innovative capacity, with a critical, reflexive and participative spirit.

In light of the above theoretical foundations, and conscious of the current day importance of ICT training for teachers at the National University of Nicaragua (UNAN-Managua), this study was conceived, with the purpose of presenting the proposal for a teacher training programme aimed at facilitating the didactical use of Web 2.0 applications. This started with the evaluation of the technological competencies of the professors at the Multidisciplinary Faculty of Carazo (FAREM-Carazo), at UNAN-Managua.

2. Context of the Research and Goals

Nowadays we have gone from a type of teaching based on an industrial society to one based on knowledge and information, one which promotes learning to learn, lifelong learning, the development of competencies, learning to live in a diverse society, as well as moral and ethical constructs (Hernández, Martínez, Martínez & Monroy, 2009). It is evident that within this framework, education becomes a most interesting tool for the development of educational competencies in society, generating a series of demands for the educational system to fit itself into a world of new challenges (Barragán & Buzón, 2004). According to the recommendations of the European Parliament and the Council (2006), digital competence is established as one of the key skills for lifelong learning for citizens of the 21st century, to guarantee active participation in society and the economy, within the European framework.

Access, management, and the correct use of technological resources are thus seen as fundamental for the professionalization of university teaching staff since they allow access to updated repositories of information which facilitate the continuous training of the faculty. Considering these points, higher education needs and demands the modernization of teaching staff facing the diversity of technological applications of Web 2.0 which should be incorporated into the different contexts of higher education and that, for the purposes of this study, are included in the New Educational Model at UNAN-Managua. This model promotes the advantages and use of ICT for being a highly valued educational resource. It implies the need for competent, modernised training in ICT, also recognising international academic demands which require highly competent teachers who are able to perform as virtual tutors in the age of digital natives (Prensky, 2010), with the sole intention of being a better guide, a better advisor, and a better mentor, given that in today´s society of information and communication, university students find themselves increasingly involved in autonomous or collaborative learning processes which require active methodologies to facilitate the integration of social software into the academic curriculum (Meneses & Galán, 2009; Schworm & Gruber, 2012).

Students will soon arrive at universities expecting a new style of teaching, one adapted to the online routines of their daily lives. Technology which the academic world considers revolutionary is ordinary for today´s alumni (Thompson, 2007). Prendes (2010) notes that the inherent changes in the process of adaptation which we are under can be summed up in three central ideas: (a) competitiveness of universities and their students: promoting better student performance, (b) quality control: in this new framework, supervision extends to all areas and agents involved. Quality is sought in qualifications (for their accreditation), in teaching and research (the role of quality assurance agencies), and also in the quality of learning at university, which implies a revision of methodological strategies. And finally, (c) the reorganization of university studies: university studies are structured around a degree (which is a more generalised studiy) or a postgraduate qualification (which is a more specialized study) which adds to the fact that ICT notably accelerates the tendency towards internationalization, precisely because in the field of higher education, the faculty is influenced by intensive use of ICT and incorporation of distance learning and interactive technologies, creating the need for continuous innovation in educational models and training regarding ICT.

In accordance with the contributions of these authors, from an introspective vision in the context of public higher education in Nicaragua, nowadays as teachers at UNAN-Managua we are aware of profound transformations in higher education at an international level, transformations deeply rooted in technological advances which change human relationships as

well as interpersonal and group-based communication (Cabero, Cataldi & Lage, 2010; San Martín, Cabrera, Abalos & Gómez, 2015), and which irremediably distort our sphere of action. Thus, it is essential to stimulate training programmes that promote the use and application of Web 2.0 technologies in teaching. On a practical, technical, and curricular level, this involves designing teacher training in digital literacy regarding Web 2.0 in higher education, a responsibility shared between social, academic and government actors as the main agents of change, innovation and transformation in this field.

To be successful in pedagogical innovation, UNAN-Managua has incorporated ICT into its Educational, Regulatory and Methodological Model for Curricular Planning 2011. "Information and Communications Technology (ICT) will not only be used to improve teaching practices in the classroom, but also to permit students other learning scenarios" (UNAN-Managua, 2011). Also, to be aware of an inclusive vision in university education, from a humanistic and scientific conception of the world. This is achieved through an educational model focused on people, with an institutional vision of autonomous, public higher education, a national and international standard in the training of professionals, and a leader in scientific production and technology in Nicaragua (UNAN-Managua, 2015). This vision assumes that education in the 21st century is subject to (a) the challenges in higher education for the 21st century; (b) the post 2015 development goals, and; (c) global, national and regional trends. Taking the above approaches as a reference, this study was conceived in the context of the Multidisciplinary Faculty of Carazo, FAREM-Carazo, at UNAN-Managua. This faculty, located in the city Jinotepe, opened its doors to the population of the southern region of Nicaragua under the name Carazo Regional University (CUR-Carazo, *for its Spanish acronym*) in 1991 (Pérez, Mendieta & Gutiérrez, 2014). Since then it has developed as an entity for social transformation and innovation, contributing to a higher quality of education for all young people in the southern region of the country.

Given the large social responsibility for the faculty at FAREM-Carazo in offering adequate, quality attention to the thousands of young people who demand higher education, and according to the most pressing needs in ICT expressed by these teachers, this proposal has been conceived. It corresponds to an ICT training programme, supporting Web 2.0 applications, with strengthening the ICT skills of the faculty at FAREM-Carazo being central and fundamental to its aim. To achieve this, the proposal takes advantage of the educational potential of Web 2.0, with the intention of helping participants to become 21st century teachers who ease the process of learning and strengthen creativity in their students, who design and develop learning experiences in line with the society of knowledge in which we find ourselves, and who also promote professional values and ethics as digital citizens. It also

aims towards(a) increased efficiency regarding procedures to be followed by the teaching staff for the didactical use of ICT resources; (b) reinforcing university-society-business relationships; (c) educational optimization of ICT applications for the teaching staff and of ICT resources available to the faculty; (d) updated training for teachers within the context of the European Framework of Higher Education (IEEE)(e) development of ICT competencies on practical and advanced levels, and finally;(f) awareness relating to digital citizens.

3. Methodology

This study is approached from a descriptive/interpretive position, for which it used the findings produced by the diagnostic research conducted by Mendieta, Cobos & Vázquez (2015) on the faculty´s perception of ICT´s educational/organizational function at FAREM-Carazo, UNAN-Managua. The study also used participant observation (Malinowski, 2009). From the position adopted by Benguría et al. (2010), participant observation is very advantageous in areas such as social education and psychology, when it is necessary to study aspects of behaviour: student-teacher relationships, the relationship between the use of specific educational technology and learning, the relationship between grades and subjects etc. Considering the contributions of the above mentioned authors, regarding participant observation as a method for acquiring information about a group as the subject of study, it is possible to infer that this approach effectively allows the detection of a problem or need when we as researchers become part of that group being studied. In this way the group being studied is also a source of information.

4. Results

In the following lines the thematic plan corresponding to this training proposal is presented. It was the result of an exhaustive process of research which turned to different sources to obtain information, and techniques to contrast and position that information. In the end this allowed a definitive training proposal to be decided through the thorough selection and revision of content related to each unit, and reflecting where the ICT training needs relating to 2.0 technology were most felt and expressed by the study´s subjects, the teaching staff at Facultad Regional Multidisciplinaria (FAREM), Carazo (FAREM-Carazo), Universidad Nacional Autónoma de Nicaragua-Managua (UNAN-Managua).

4.1. Thematic Plan for the Programme

No	Unit	Contact Hours Conferences and Expositions	Practical	Total
I	ICT in the new context of higher education	4	2	6
II	Online information searches	3	6	9
III	Educational applications of Web 2.0	8	17	25
	Total	15	25	40

Table 1. *Thematic plan for the training programme*

4.2. Specific Objectives of the Programme

Nº	Conceptual	Procedural	Atitudal
1	Strengthen participating professors´ knowledge regarding educational use of ICT in teaching/learning processes.	Balance the differences in level between participating professors´ knowledge regarding educational use of ICT in teaching/learning processes.	Cooperation in strengthening participating professors´ knowledge regarding educational use of ICT in teaching/learning processes.
2	Develop amongst the professors a culture of continuous self-teaching of ICT through online search tools which enhance their academic and professional performance	Boost the culture of continuous learning amongst the professors in the light of ICT, allowing an enhancement in their overall development on a practical, technical, and curricular level through the implementation of online search mechanisms	Encourage the faculty´s motivation for a continual deepening of their understanding of ICT through reasoned and certain information searches which can be taken advantage of in terms of education and training.
3	Recognise the educational value of ICT through the development of training activities supported by Web 2.0 applications.	Put into practise the different uses and educational applications of ICT through Web 2.0 applications	Value the importance of ICT in the society of knowledge and information from an educational perspective, with the support of Web 2.0 applications.

Table 2. *Specific objectives of the training programme.*

5. Conclusions

The proposed training programme will be implemented in the first trimester of 2016. It will involve a sample of 25 professors distributed as follows: 5 professors from the Department of Science, Technology and Health; 10 professors from the Department of Economic and Administrative Sciences, and; 15 professors from the Department of Education and Humanities at FAREM-Carazo. The professors will be selected by the directors of their corresponding academic departments, however those selected should fit the following profile: be part of the teaching staff or be in the hiring process at FAREM-Carazo, have at least 2 years of experience in higher education, be between 23 and 45 years old, have a Master´s qualification or be actively studying in a Master´s programme in line with his or her speciality, have basic knowledge of English and word processing software, spreadsheets and presentation software, to have designed at least one academic course on the virtual platform Moodle, be proactive and an independent learner, and demonstrate availability and willingness to help with the training programme while it is under way. They should also be willing to complete activities assigned by the facilitating team and show institutional commitment in terms of passing on knowledge acquired through developing their teaching practice through the use of ICT.

It should be noted that for the design of this training proposal, regulations concerning the design of continued education courses at UNAN-Managua have been observed. Hence, once the training programme has been completed, the professors who took part will receive a certificate of participation granted by the department of Postgraduates and Continued Educational FAREM-Carazo.

The units to be addressed in the training programme are: ICT in the new context of higher education, online information searches, and educational applications of Web 2.0. Within these are also addressed, amongst others, the following areas: forms of online communication and their evolution, advanced information searches, ethics and responsibility of digital citizens, new communication strategies through digital applications of Web 2.0,blog creation using Blogger, embedding videos, Scribd documents, SlideShare presentations, creating a Mindomo account, mind-map design, and information and practise in creating presentations in Prezi.

Competencies to be developed
Knows about the evolution of the Web
Differentiates between Web 1.0 and Web 2.0
Values the didactical use of Web 2.0 applications
Identifies technological teaching tools for their students
Identifies synchronous and asynchronous communication
Knows about technological systems employed in education

Searches for information online
Looks for new methodologies, strategies and techniques using ICT
Selects and criticises online information
Knows about online security
Employs ethics in searching for and selecting information online
Knows about methodologies based on collectivism
Plans information employing ICT
Uses Youtube
Designs virtual learning environments
Controls different online learning platforms
Creates Wikis and blogs to further the learning of their students
Uses Wikis for the creation and elaboration of texts
Designs presentations using SlideShare
Creates mind-maps using Mindomo
Uses technology for self-teaching
Uses ICT as a means of professional development
Uses social networks to maintain relationships with colleagues and students
Works on their presentations using Prezi
Employs information ethics

Table 3. *Competencies to be developed in the training programme*

Although the inclusion of ICT in the higher education system in Nicaragua has been slow, nowadays it is possible to confirm that the use of these tools has increased in teaching and administration amongst the faculty, as pointed out by the Institutional Strategic Plan at UNAN-Managua, which establishes that, the academic management of new information and communications technology necessarily implies modifying the inputs, processes, and products of higher education. Online and in-person training for teachers, researchers, students and administrators is also imperative to ensure full use of ICT (UNAN-Managua, 2014).

Credible proof of this is the realisation of innovative ICT suggestions by professors at FAREM-Carazo, who demand up-to-date, continuous training which genuinely contributes to their competency regarding digital capabilities on a practical, technical, and curricular level, and which allows them to perform better for their students.

In this sense, the faculty is acutely aware of the need for educational innovation, which is not about breaking away from pedagogical foundations but rather adapting those foundations with technology, leading to significant improvements in teaching and management, and encouraging a change in the profile of the university student (Esteve & Gisbert, 2012). In this sense, we coincide with Ander (2005), in pointing out that, having already entered the 21st century, the analyses and debates about the use of technology have gone beyond the debate about whether it is good or bad for bettering teaching

practice. In the information society, the use of new technology in the teaching/learning process is widely accepted.

In view of the diverse technological applications of Web 2.0, and the needs in ICT training as expressed by the teaching staff at FAREM-Carazo, an ICT training programme with Web 2.0 applications has been designed with the intention of strengthening digital competencies in practical, technical, and curricular areas, on basic and advanced levels. For this purpose, three didactical units were defined as part of the domain of theoretical knowledge of ICT and its relationship to the current university curriculum according to the guidelines presented by the European Higher Education Area but adapted to our context of action.In this sense the goal is to prepare teachers who are capable of understanding new technology both for supporting social development and for improving the economic productivity of Nicaragua.

Two units have also been defined with the intention of increasing ICT expertise on a practical and didactical level, to take full advantage of ICT resources available to the faculty and optimise their use. These units are: searching for information online and educational applications of Web 2.0, including the selection of applications for creating presentations, creating mind maps, creating files and the publication of those files with the goal of creating a virtual community between professors; to favour communication and management of information; to promote responsibility as digital citizens and security of information on the network.

Finally, the design of the proposed training programme was conceived in such a way that the results in the participating professors, once the programme is complete, will work towards the achievement of academic competencies in terms of methods, techniques, and new tools in the process of teaching/learning; administrative abilities, specifically related to developments in planning, organisation, management and control, and finally; social skills regarding interaction, i.e. in the achievement of abilities, interests, motives and ways of acting.

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Use of Information and Communication Technology in Initial Teacher Training. Case studies on the frameworks, the requirements and the ways. of preparing student teachers in their ICT enhanced subject teaching. February 2010. • Teacher training institutions which are publicly recognised as advanced or innovative for the use they make of technology for teaching and learning purposes in initial teacher training programmes. • Teacher training institutions which are publicly recognised as quality providers of initial teacher training, irrespective of their use of technology. The selected teacher training institutions, 2 universities and 2 university colleges of teacher education, are: Overview on cases. Information and communications technology (ICT) is an important part of most organizations these days (Zhang & Aikman, 2007). Computers began to be used in schools in the early 1980s, and several scholars suggest that ICT will be an important part of education for the next generation (Bransford, Brown, & Cocking, 2000; Grimus, 2000; Yelland, 2001). This study provides teachers' perception and perceived barriers to the use of technology tools in classroom's teaching and learning process. It acts as a platform for the Ministry of Education to produce a technologically literate, critically thinking work force, which is prepared to participate fully in the global economy of the 21st century (Ghavifekr & Mohammed Sani, 2015). It provides examples, case studies, lessons learned, and best practices that will help planners and decision makers in addressing pertinent issues and crafting policies and strategies appropriate for the information economy. This e-primer is also available online at www.eprimers.org. and www.apdip.net. How does the use of icts help prepare individuals for the workplace? How can the use of icts help improve the quality of education? The uses of icts in education how have radio and tv broadcasting been used in education? What is teleconferencing and what have been its educational uses? [45] In higher education and adult training, there is some evidence that educational opportunities are being opened to individuals and groups who are constrained from attending traditional universities. A common mistake in estimating the cost of a particular ICT educational application is to focus too much on initial fixed costs—purchase of equipment, construction or retrofitting of physical facilities, initial materials production, and the like. But studies of the use of computers in classrooms, for example, show that installation of hardware and retrofitting of physical facilities account for only between 40% to 60% of the full cost of using the computers over their lifetime, or its total cost of ownership.