

Faculty Preferences for Training Modalities on ICTs

Preferencias del profesorado universitario sobre modalidades formativas en TIC

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Abstract

The goal of this research is twofold: firstly, to identify the possible differences in faculty's attitudes toward and use of new technological resources; and secondly, to identify the educational interaction established with the students through the use of information and communication technologies (ICTs). A survey was administered to the University of the Basque Country (UPV/EHU) Gipuzkoan Campus faculty to measure the level of knowledge of ICT tools, the ICT training strategies being used, and the faculty's preferences on the training they would like to receive in relation to those tools. A total of 472 of the 1,074 faculty members of the aforementioned campus took part in the research. The analysis of the data obtained from the survey provide us: a) a better understanding of the interrelation between the faculty's ICT knowledge and their teaching and research tasks; b) an identification of the faculty's preferred methods of acquiring such knowledge; and c) a precise determination of the relationship between the level of ICT knowledge and the preferred learning methods.

Keywords: Information and communication technology (ICT), higher education, training, learning strategies.

Resumen

El propósito de esta investigación es el de identificar eventuales diferencias en las actitudes y utilización de los nuevos recursos tecnológicos así como en la interacción educativa con el alumnado que se establece a partir del uso de las tecnologías de la información y la comunicación (TIC). Se obtuvieron datos por encuesta acerca del nivel de conocimiento de herramientas TIC, de la estrategia formativa utilizada en su aprendizaje y de las preferencias formativas en este ámbito. En el estudio participaron 472 de los 1.074 profesores del Campus de Gipuzkoa de la UPV/EHU. Los resultados obtenidos permiten: a) una comprensión mejor que la hasta ahora disponible sobre las relaciones entre los conocimientos sobre TIC del profesorado y sus tareas docentes y de investigación; b) la identificación de las modalidades preferidas para la adquisición de dichos conocimientos; y c) precisar relaciones entre el grado de conocimiento de las TIC y las preferencias formativas.

Palabras clave: Tecnología de la información y la comunicación (TIC), educación superior, formación, estrategias de aprendizaje.

Introduction

The information technology revolution, including innovation technologies such as distance education, has deeply begun to impact our understanding of a *traditional university*. However, certain aspects of the traditional learning experience will not vanish in a near future. Consequently, the use of new information and communication technologies (ICTs) in order to improve the quality of the education offered by the university in the 21st century is even more relevant.

The Internet has radically modified the ways that knowledge is transferred. In the most socio-economically advanced countries, ICTs have spread exponentially and have affected practically all dimensions of the higher education system. The spaces of social networking creation, through electronic mail (e-mail) and the Internet, have encouraged joint research collaborations among university faculty members. The number of electronic academic journals has increasingly grown in quantity and quality. In certain disciplines, e-journals have acquired great relevance. Even more, traditional publishers have begun to use the Internet to distribute their publications. The movement favoring cost-free education has regained new strength regarding the free access to educational resources such as courses, study plans and pedagogical strategies that may not exist at the local level.

ICTs have transformed the teaching landscape by increasing

the number and types of students, designers of study plans as well as modalities of teaching and pedagogical innovation (Altbach, Reisberg, & Rumbley, 2009). It is extremely difficult to calculate the number of people who take university e-learning distance courses in the world. Nevertheless, the existence of twenty-four mega-universities, some of which proudly admit to having more than a million students, highlight the significance of this quantitatively important phenomenon.

For the last few years, there have been an increasing number of different proposals to train faculty members on ICTs. It cannot be ignored that faculty members belong, due to their age, to a social group that was educated on printing technology, which continues to be regarded as the only natural habitat of culture and knowledge (Yanes & Area, 1998). Consequently, there is a need to emphasize (Bernal, López, & Zamarro, 2003) the technical components that faculty members, nowadays, need to know. It is becoming essential to teach them new digital technologies so they are able to adapt with the new ongoing educational processes.

If compared to a few years back, the introduction of faculty training on ICTs has become an important change. But, for many faculty members, going back to training is a daunting task, particularly if the last training happened many years ago. On the other hand, it makes sense (Correa & De Pablos, 2009; Correa

& Paredes, 2009) that new technologies have to become useful tools in the development of creativity, personal expression, and learning how to learn. New technologies might support the abilities of creativity and critical thought without exclusively focusing on the efficient achievement of traditional learning goals, which has been the focus of much of the research done on ICTs up until recently. To accomplish this, there is a need to improve the training processes of the faculty and the work of the educational centers in line with investigations of this nature.

The advantages of the application of new technologies are undeniable; however, we also need to take into account its disadvantages, which could come from its inadequate or improper use. Consequently, there is a need for an appropriate teaching model for the use of ICTs to avoid a mere displacement of the classroom's dogmatic contents to the virtual space. On the contrary, these new technologies should be used to obtain a higher level of communication and interaction between teacher and student (Palomares et al., 2007).

Taking into account the methodological orientation to reform higher education, and the description of the tasks related to the student's independent work, the new study plans have already developed a new way of working, highlighting those competencies related to the use of ICTs (López, 2010).

Confronted with this new challenge for university teaching, in

recent years, a number of studies on the use of ICTs in higher education have been published (Bautista, 2001; Cabero, 2002; Lupiáñez & Duart, 2005; Uceda & Barro, 2008), which, for the most part, have allowed us to determine the technological possibilities for teachers in this area as well as the evolution of the level of knowledge in ICTs of the university teaching faculty.

Regarding the utilization of technological resources in the Spanish university teaching system, it can be said that, in 2008, 52% of the subjects taught in Spanish universities had a software platform to help out with the teaching; 96% had a virtual training plan; and 63% of the teachers and 76% of the students used the aforementioned platform. That is to say, there is a high usage of those technological resources in the classroom, while, in parallel, there is a rapid and significant increase of training provided to teachers in relation to ICTs. However, gaps in the faculty's training have been detected (Lareki, Martínez de Morentin, & Amenabar, 2010), which we are going to address in the following paragraphs.

The training of university faculty is not due to the result of institutional measures but to their own personal interest and self-teaching (Alba & Carballo, 2005). University faculty have perceived the need for and advantages of new technologies in their daily academic practice (Antón & Zubillaga del Río, 2008). Consequently, the university

teaching faculty has a high level of knowledge and usage of the most popular communication tools, including e-mail, Internet and Internet browsing, as well as the most basic computer applications. However, this knowledge is related to personal use rather than to their interactive work with students.

In addition, the tailored training, adjusted to the characteristics, needs and expectations of the teaching faculty, has proved more efficient than other types of training (Pérez & Salas, 2009). In this type of training, the courses and programs are not only adjusted to the specific faculty characteristics and needs, but they are designed to find a balance between the technical skills and the pedagogical applications of the ICTs. It is understood that the training of academic staff regarding the implementation of ECTS (European Credit Transfer System) has to take into account both the technical and pedagogical levels.

Most of the teaching university faculty prefer a training offered by teachers specialized in EHEA (European Higher Education Area) and ECTS, which focuses on adjusting their courses to the new methodology. Regarding the training offered, the faculty envision working groups within their departments as well as a specific administrative unit for the EHEA (De Pablos & Villaciervos, 2005).

Previous research indicates the faculty's preferences for specific training on ICTs as well as their pre-

ferred use. Nevertheless, the designs of training offered could benefit from the attitudes and knowledge of faculty. Particularly, it is important to identify differences in the utilization of new technological resources as well as the educational interaction established with the students through the use of ICTs. Consequently, our research attempts to achieve three goals: 1. to identify the relationship between the faculty's knowledge and their teaching and research tasks; 2. to identify the modalities that the faculty have followed to gain such a knowledge; and 3. to understand the faculty's preferences for training, focusing on the relationships between the level of knowledge of ICTs and the training preferences.

Method

Participants

A total of 472 teaching faculty of the 1,074 teaching and research faculty of the University of the Basque Country (UPV/EHU) Gipuzkoan campus took part in the research. The sample selection was a simple random type. Male participation was slightly higher (51.9%) than female participation (48.1%). The participants came from different disciplines and areas of study, including Social Sciences (28.6%), followed by Engineering (19.7%), Humanities (15.7%), Experimental Sciences (12.9%), and Health

Sciences (3.8%). Close to 19.3% did not answer the question regarding their discipline area.

In sum, 43% of the total of the Gipuzkoan campus faculty took part in the study, being a representative sample with a reliability of 95% and an error margin of 3.45% .

Variables

1. *Computer resources*: a) basic or those used often (e.g., Internet, e-mail, word processors, online forms); and b) specific or those that require specific knowledge (e.g., statistical analysis packages, virtual teaching platforms, programs to manage blogs or websites). Through twenty-one items, we measured three categories: the level of knowledge, the level of utilization, and the training needs regarding each of the resources.
2. *Faculty's tasks*: teaching, research and management. Fifteen questions dealt with teaching resources, twelve dealt with research tasks and seven with management.
3. *Faculty's training acquisition of the computer resources that they have*.
4. *Faculty's learning preferences regarding the type of training on ICTs*.

The tool used to collect the data was a survey of thirty-six close-ended questions grouped in the aforementioned variables.

Procedure

The questionnaire, in Spanish and Basque, was designed as a web-based survey, and it is available at <http://www.ehu.es/tic>. The database on the faculty was created in collaboration with the Gipuzkoan campus Vice-rector. In addition, the Vice-rector's office resources, for instance, to send mass mailings (online and physical) to the entire Gipuzkoan campus faculty, which included the link to the online questionnaire as well as hard copies of the survey, were instrumental to the success of the research project.

The survey was sent in two different phases. Firstly, the Gipuzkoan campus Vice-rector's office sent a mass e-mail message, informing the faculty of the existence of the online questionnaire. Secondly, after collecting the responses from the online survey, the Vice-rector's office sent a formal letter to the faculty to remind them of the possibility of completing a printed version of the survey as well as the instructions for doing so.

Of 472 people who responded to the survey, 331 filled the survey in Spanish and 141 did it in Basque. On the other hand, 343 people (70%) completed the questionnaire online, while 129 used the printed version of the survey.

Data Analysis

We used the SPSS (version 14.0) statistical program to analyze the

frequencies, descriptives, «One-way ANOVA», test-t and chi-square. The qualitative data, collected from open questions, were analyzed with the software program NUDIST 6.0. To do so, we identified units of meaning related to the preestablished variables, which, later on, were categorized and put in a hierarchy order.

Results

We broke up the results of the analysis into the three following areas: knowledge of ICTs, acquisi-

tion modalities, and training preferences.

Knowledge of computer applications and resources

The data regarding the knowledge of technological resources is presented in table 1. The level of knowledge is measured according to a Likert Scale: 1 = lowest, 2 = low, 3 = high and 4 = highest.

Taking into account the level of specificity of the variables, classified as basic and specific technological resources, the data indicates

Table 1

Knowledge of different technological resources

Teaching tasks					
Basic resources	Mean	SD	Specific resources	Mean	SD
Overhead projectors	3.10	1.05	Mailing lists	1.79	.94
Computers	3.79	.54	Blogs	1.34	.61
Word processors	3.85	0.48	Virtual teaching	1.42	.75
Internet browsing	3.62	.68	Databases	1.95	.93
E-mail	3.80	.54	Spreadsheet applications	2.35	1.06
			Graphic design programs	1.78	.90
Research tasks					
Basic resources	Mean	SD	Specific resources	Mean	SD
DVD reproduction programs	2.16	1.02	Online forms	1.59	.92
			Digital video editing programs	1.29	.65
Programs for the creation of PDF documents	1.77	.94	Communication platforms	1.77	.94
			Video-conference systems	1.29	.58
Statistical packages	1.82	1.03	Bibliography/reference management programs	1.76	.86
			Project management programs	1.28	.66

that the faculty have a high-level understanding of basic technological resources (2.99). However, the faculty's knowledge of specific resources is considerably lower (1.66).

That is to say, word processors, the use of e-mail and computers in the classroom, and overhead projectors obtained the highest marks of knowledge, with a mean between 3.10 and 3.85. Nevertheless, the faculty's knowledge decreases in relation to specific teaching applications: spreadsheet application software, graphic design programs, virtual teaching and blogs. They obtained a mean between 2.35 and 1.34. Overall, the specific applications used in re-

search tasks, such as project management programs, video-conference systems, bibliography/reference management programs and communication platforms, obtained a mean between 1.77 and 1.28. The mean is slightly higher in relation to the basic resources used in research tasks than the specific resources.

Modalities for training on ICTs

In table 2, we present the data related to the training modalities used to acquire knowledge of ICTs. The level of acquisition of ICT training is measured by the responses given to seven options, and those

Table 2

Processes used to acquire knowledge of ICTs

	N (%)	Social Sciences and Law	Experimental Sciences	Health Sciences	Engineering	Humanities	X ²	Sig.
Courses offered by the university	168 (35.5)	40.7%	27.9%	38.9%	26.9%	45.9%	9.63	.04*
Courses external to the university	117 (24.7)	26.7%	16.4%	33.3%	25.8%	35.1%	6.43	.16
On-campus learning	58 (12.2)	11.1%	9.8%	22.2%	16.1%	12.2%	3.19	.52
Online or virtual learning	36 (7.6)	8.9%	6.6%	11.1%	5.4%	10.8%	2.17	.70
Individualized training according to my needs	106 (22.4)	21.5%	23.0%	22.2%	17.2%	31.1%	4.69	.32
Self-taught	406 (86.0)	81.1%	85.2%	83.3%	87.1%	85.1%	0.69	.95
Acquisition of knowledge following advice given by my colleagues	247 (53.3)	47.4%	67.2%	61.1%	46.2%	58.1%	9.60	.04*

responding could choose more than one option. Consequently, the total sum of percentages exceeds 100%.

Regarding the various training modalities on ICTs, the great majority of faculty is self-taught (86%), followed by those who acquired knowledge from the advice given by university colleagues (52.3%). On the other hand, nearly 10% of the participants have taken part in online training courses.

The variable «knowledge field» (i.e., the field of study that each faculty belongs to) has little to do with the training processes. The courses offered by the university and the knowledge obtained following the advice of faculty colleagues offer significant differences for a limit of $p > .05$. Particularly, faculty members of the Social Sciences and Law as well as Humanities schools took courses offered by the university, while those faculty members belonging to Engineering and Health Sciences mostly relied on the advice of their colleagues on the application of ICTs to their teaching and research.

Confronted with the results, we found it interesting to explore the faculty's opinion on self-teaching as a method of acquiring skills related to ICTs. For them, the most beneficial characteristic of self-teaching is the «trial and error» experience. However, they believe it is quite difficult to gain a complete understanding of digital tools (and their use) by exclusively using self-teaching methods. Consequently, the participants in the study are in favor

of training methods sanctioned by the university in order to avoid the lack of knowledge embedded in the aforementioned training methods.

Preferences on training acquisition in relation to ICTs

Finally, we studied the faculty's preferences, by age and sex, for the training offered on ICTs in relation to the context of the training and the level of virtuality and on-campus training. The results are shown in tables 3 and 4. The totals exceed 100% as those responding could choose more than one option.

Under similar conditions, faculty prefer to acquire their training on ICTs through individualized specific training (46.1%), which should focus on their specific centres or departments (45.1%) in comparison to the training that focuses on the entire campus (13.5%). In other words, the unities of primary association (centre or department) are more valued by the faculty than those secondary units of association (campus).

Regarding the typology, we do not observe great differences in the faculty's preferences for the method of receiving the training courses, i.e., virtual or on-campus training. Nearly 33% of the faculty opted for online classes, while close to 31% opted for on-campus training. Only 24.1% of the respondents preferred online training with on-campus tutor support.

Nearly 1.7% of the faculty who participated in the survey stated that

Table 3

Faculty's preferences on the acquisition of training by age group

Types of training	N (%)	Age group					X ²	Sig.
		< 30	31-40	41-50	51-60	> 60		
Complete systems for the whole campus	13.5%	16.0%	16.9%	11.8%	13.5%	9.5%	2.13	.71
Specific learning for each centre or department	45.1%	60.0%	52.2%	43.8%	38.2%	38.1%	7.12	.12
Individualized training according to my needs	46.1%	56.0%	43.4%	47.8%	44.9%	61.9%	3.59	.46
On-campus learning	30.7%	44.0%	27.9%	29.2%	38.2%	28.6%	4.98	.28
Online or virtual courses with online tutor support	32.8%	28.0%	36.8%	33.7%	28.1%	42.9%	2.97	.56
Online or virtual training with on-campus tutor support	24.1%	28.0%	18.4%	27.0%	28.1%	33.3%	4.90	.29

Table 4

Faculty's preferences on the acquisition of training by sex group and meaning of the difference

Types of training	Sex		X ²	Sig.
	Female	Male		
Complete systems for the whole campus	11.2%	16.4%	2.54	.11
Specific learning for each centre or department	52.6%	40.5%	6.50	.01*
Individualized training according to my needs	51.2%	43.1%	2.91	.88
On-campus learning	36.3%	27.2%	4.30	.03*
Online or virtual courses with online tutor support	30.2%	37.1%	2.33	.12
Online or virtual training with on-campus tutor support	22.8%	26.3%	0.73	.39

they did not need any training on the utilization of ICTs in relation to their teaching work.

We do not observe any significant differences by age group in relation to the selection of preferences for how to acquire training, always for a significant limit of $p < .05$.

Remember that the survey's choices were not exclusive and therefore the total percentages exceeded 100%.

Table 4 presents the preference for the type of training in relation to gender. It shows that there are slight but meaningful differences

Table 5

Differences of knowledge between basic and specific applications

	Preference for on-campus training	N	Mean	SD	T	Sig.
Knowledge of basic ICT applications	yes	161	2.28	.78	.08	.001
	no	62	2.67	.77		
Knowledge of specific ICT applications	yes	184	2.09	.62	.05	.000
	no	77	2.45	.61		

according to the faculty's gender. Particularly, women showed the highest percentage of preference for specific training provided in their centres or departments as well as for on-campus training courses.

The results presented here made us wonder if there would be a type of teaching faculty who would need, preferably, a specific type of training, i.e., on-campus or virtual. Table 5 compares the level of knowledge of ICTs in basic applications and specific applications. In sum, we can conclude that those faculty members who preferred on-campus training obtained a lower mean in relation to the level of knowledge in both basic and specific ICT applications.

Those faculty members who preferred on-campus training present a self-evaluation mean of 2.28 in relation to their knowledge of ICTs. On the other hand, those faculty members who did not opt for on-campus training present a self-evaluation mean of 2.67. Surprisingly, the number of respondents who chose the on-campus training

is nearly one-third larger than those who did not choose such an option. The same happens in the case of specific resources, though the means are relatively lower (preference for on-campus training, 2.09; non-preference for on-campus training, 2.45). In both cases, the analysis of test-t indicates that the difference between both means is significant at a 0.05 level ($p = 0.001$ and $p = 0.000$). It can be said that there are meaningful differences regarding the preference for basic and specific on-campus training. Those teaching faculty members who preferred on-campus training have, on average, a significantly lower knowledge of both basic and specific ICT applications than the rest of the faculty.

Discussion

In relation to *ICT knowledge*, evidence shows that, as the technological applications increase in technical complexity, the faculty's level of knowledge as well as their

utilization of ICTs decrease. In this regard, the results of our research corroborate previous studies (Bautista, 2001; Cabero, 2002; Lupiáñez & Duart, 2005; Uceda & Barro, 2008; Alba & Carballo, 2005). Those previous studies showed the university faculty's level of knowledge in relation to basic computer applications. In the present study, we evidence that the degree of faculty's knowledge is broader and makes reference, in the first place, to teaching and research tasks and, in the second place, to a classification of computer applications based on their basic and specific characters. The level of knowledge of the aforementioned resources depends on the specificity of the application rather than on the specific tasks required. The university faculty has a high level of knowledge of basic resources regardless of whether they are utilized for personal use, in teaching or in research tasks. However, the faculty reported a low level of knowledge of specific applications whose technical complexity is higher than that of basic applications.

In relation to the *acquisition of training*, evidence shows that most of the university faculty are self-taught on the subject of ICTs, while other faculty members have acquired their knowledge of new technologies by asking for advice from their colleagues. This fact, which was also described by previous studies (Antón & Zubillaga del Río, 2008; Alba & Carballo,

2005), has been corroborated by the present research. Even more, our study goes into detail to learn about the main reason behind the self-taught method: necessity. There is this common assumption that we generally learn what we need to learn, and this need makes what we have learnt perdurable. However, faculty positively valued the regulation of this type of training by the university, with the purpose of acquiring a wide range of training on computer applications and programs, as the contents acquired through self-teaching are not that extensive.

Regarding *training preferences*, as previously stated by some studies (e.g., Paredes & Estebanell, 2005), our study also shows that most of the faculty prefer to be trained on ICTs in close proximity to their working environments: centers, departments, and department's branches. That is why the faculty suggested that ICT training should focus on educational issues related to ECTS. Furthermore, they strongly recommended that the training courses should be offered by the university, while any organized seminars should target specific subjects, encouraging a networking culture and the development of open teaching through the use of ICTs (Paredes & Estebanell, 2005).

However, our study also differs from previous studies (Pérez & Salas, 2009; De Pablos & Villaciervos, 2005) in that those studies linked the level of ICT knowledge to different variables such as age,

sex, and field of knowledge, but our research evidences that social variables such as sex, age, and field of knowledge are not related to the preference of university faculty for ICT training. This marks a clear difference in comparison to previous works.

Moreover, faculty can be divided into three proportional groups when indicating their preference for ICT training: on-campus, online and blended training. Consequently, there is a need to take into account those three options when thinking about designing ICT training programs. Nevertheless, as the study evidences, those faculty members who preferred on-campus training lacked in knowledge in comparison to their colleagues, so basic training courses would preferably be given on campus.

Having in mind the results of the research, we propose five recommendations to improve the utilization of new information and communication technologies in the context of higher education.

1. We propose the establishment of a system to regularly detect the faculty's training needs, so that, in the ever-changing environment of new technologies, a real alternative can be offered to the self-training currently being utilized.
2. There is a need to learn about the faculty's preferences on training design, matching the needs of each faculty to the training offered.

This would increase the participation of the faculty in the training processes.

3. We suggest the organization of continuous training by content blocks as a way to capitalize the acquired learning whenever new content is introduced.
4. We propose that the training needs should be adapted to the demand.
5. There is a need to intervene in the faculty's working environments to facilitate any project that focuses on the utilization of ICTs with the intent of improving teaching.

Regarding the limitations of the study, we need to indicate the existence of a certain level of social desirability in the responses given, as the participants might have understood the questionnaire as a way to evaluate their level of knowledge and usage. In contrast, the study has been able to confirm the feasibility of using online questionnaires via the Internet as a useful tool for collecting data for educational research (Cohen, Manion, & Morrison, 2007).

Note

This research is part of a larger research project entitled «Study of the ICT Training Needs of the Faculty Staff at the UPV/EHU Gipuzkoan Campus» (Ref. BOPV-106-08062004). It is funded by the University of the Basque Country and the Provincial Council of Gipuzkoa.

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Fecha de recepción: 02-02-10 Fecha de revisión: 08-09-10 Fecha de aceptación: 15-09-10