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Teachers' Satisfaction Concerning the Use of ICT in Rural Educational Centers of Andalusia (Spain)

Abstract

This is a study on the use of Information and Communication Technologies (ICT) in education, with a particular emphasis on rural schools, covering topics that range from the insights of teachers on the necessary adaptation of their work methods, to the actual use of ICT in the classroom. To this end, a descriptive methodology is applied through a non-experimental design by means of a survey, targeting a sample of 217 individuals. The objective is to determine the degree of satisfaction of rural teachers of the autonomous community of Andalusia with what concerns the role of ICT and current technology management strategies. The study was carried out from the point of view of teaching and school organization. Above all, the interest lies in determining which aspects of this new reality are more appealing to the teacher, from personal and professional standpoints. Some of the most relevant results and conclusions point out a high degree of satisfaction with the novel possibilities offered by ICT while enhancing teaching and broadening professional relationships. In turn, these same conclusions highlight that the most significant constraints occur at the organizational level (e.g. management, resource allocation), which represents a key aspect for the improvement of these educational centers in the near future.

Keywords: *rural school, satisfaction, Information and Communication Technologies, teaching staff, IT centers*

1. Previous Work

With the emergence of the information society and, acknowledging this fact (Márquez, 2002; Boix, 2003; Feu, 2004; Corchón, 2005; Bustos, 2006; Hinojo, Aznar & Cáceres, 2009; Raso et al. 2010; Cabero, López & Jaen, 2013), a significant and ambitious investment in the rural environments has been carried out by the public administration, not without a certain delay. It resulted in the implementation of official programs fostering the integration of ICT into the classrooms. Under this approach, certain initiatives constituted a decisive step towards the introduction of these kinds of tools to the environment that was traditionally forgotten (Berlanga, 2003; Consejería de Educación y Ciencia, 2003, Corchón, 2005; Hinojo, Raso & Hinojo, 2010). Noteworthy initiatives include the Alhambra plan, the Andaluz plan for the Introduction of New Image and Communication Technologies (*Plan Andaluz de Introducción a las Nuevas Tecnologías de la Imagen y la Comunicación – P.A.I.N. T.I.C.*), the REDAULA and AUL@BUS plans and, in a more long-term approach, the creation of the Resource Centers (*Centros de Recursos – C.E.R. E*), the AVERROES network and the ICT centers.

It has not been enough to reduce the presence of ICT in these schools (Chacón, 2003, Corchón, 2005; Corchón, Raso & Hinojo, 2013). On the contrary, it has managed to progressively increase this presence to the point that it has become necessary to enquire about the extent to which these tools are appealing to the teaching staff who are, after all, the ones who are actually going to use them for pedagogical purposes. This constitutes motivation and stresses the need for research (Chacón, 2003; Corchón, 2005; Prendes, Castañeda y Gutiérrez, 2010; Raso, 2012).

Given the fact that there have been no documented studies addressing teachers' satisfaction with the influence of ICT on teaching and, taking into account all the issues pointed out by Corchón (2005) and Bustos (2006) concerning education in this environment, it seemed interesting to combine both lines of work in research that could evaluate precisely these levels of satisfaction among the teaching staff of the rural areas of Andalusia. In so doing we wanted to learn; (1) if rural education is developing towards the knowledge society; (2) if it is breaking with the traditional social stereotype of underdevelopment; and (3) if there is still a long way to go to fully accomplish this.

2. Description of the Study

2.1. Objectives

The presented study aims to efficiently address the following objectives:

- Evaluate the level of satisfaction of the teaching staff of rural areas of Andalusia in what concerns the presence and use of ICT in teaching;
- Assess, additionally, the level of satisfaction of these professionals regarding the management of ICT in the scope of school organization;
- Analyze the general level of satisfaction of teachers in what concerns the role that, globally, these technologies play in the rural educational centers of Andalusia;
- Determine the existence of statistically significant differences in these levels of satisfaction (in the scope of teaching and school organization) according to the gender and age of the teaching staff; and
- Define directives and future lines of research in this field to optimize the integration of ICT in the rural areas of Andalusia.

2.2. Methodology

This study was part of an extensive scientific project, carried out by the research group Analysis of the Reality of Education in Andalusia (*Análisis de la Realidad Educativa Andaluza* – A.R.E.A. / HUM-672) of the Department of Didactics and School Organization, of the University of Granada, supported by the Office of Science and Innovation. The main aim of this project was to evaluate the state of initial and constant training programs, their practical integration into the classroom and the satisfaction of the teachers of the rural schools of Andalusia with what concerns ICT.

2.2.1. Sample

The target population of the study comprised teachers who developed their professional occupation within the so-called *Colegios Públicos Rurales* – C.P.R. (Public Rural Schools) in Andalusia during the academic year of 2012/2013. In order to determine the size of the universe of the study, written requests were sent to the Ministry of Education of the Council of Andalusia. Unfortunately, we were not provided with the number of teachers or any data that would allow us to deduct it objectively. Thus, the size of the population is unknown.

The Ministry did, however, facilitate a census with the 126 C.P.R. that were, at that moment, part of the autonomous community of Andalusia, which led us to using the centers rather than the teachers as sampling units. Table 1 shows the proportion of these institutions present in each of the provinces of Andalusia.

Table 1. Population of C.P.R. in Andalusia

Province	C.P.R.	%
Almería	17	13.49%
Cádiz	9	7.14%
Córdoba	11	8.73%
Granada	47	37.3%
Huelva	10	7.94%
Jaén	17	13.49%
Málaga	14	11.12%
Sevilla	1	0.79%
TOTAL	126	100%

Source: own research.

2.2.2. Tools

In order to carry out the study, a questionnaire was developed with 127 closed-ended multiple choice items, designated as *Escuela Rural Protocolo de Nuevas Tecnologías* – ERPNT (Rural School Protocol of New Technologies), which was categorized into four subjects:

- Identification of the school and its localization / zone of influence (ERPNT – 1);
- Initial and constant training of the rural teaching staff on ICT (ERPNT – 2);
- Usefulness of ICT inside and outside the classroom, according to the teaching staff of the rural schools of Andalusia (ERPNT – 3); and
- Satisfaction of the teaching staff of Andalusia with ICT (ERPNT – 4);

In order to validate its content and structure, ERPNT was submitted to the analysis of 15 experts: five in-service teachers affiliated with two different C.P.R. of Andalusia, five teachers of the Department of Methods of Research and Diagnosis in Education of the University of Granada (U.G.R.) and another five teachers of the Department of Didactics and School Organization of the same institution, all of them experts in Educational Technology. The evaluation by the experts resulted in posterior modifications to the instrument, leading to the definitive version that was forwarded to the educational centers.

In what concerns the computation of the internal degree of consistency of the scale, Cronbach's α coefficient was used (0.865).

Following the generally accepted assumption according to which a value equal to or higher than 0.7 in this index means that the tool is coherent (Abad & Vargas, 2002; Sánchez, 2007; Latorre et al., 2003; Cardona, 2002), it can be concluded

that according to the statistics obtained (0.834), this questionnaire's internal consistency (83.4%) is statistically significant. This certifies the reliability of the results obtained as a basis for drawing scientifically valid conclusions.

Similarly, the reliability of the sub-scale relative to the satisfaction of rural teachers with ICT (ERPNT – 4) was established, and its results are the subject of this study. The value of Cronbach's α amounts to 0.898, which also grants it solid internal consistency.

ERPNT – 4 consists of 18 Likert-type intensity items, grouped in two main domains: teaching and school organization. The former, composed of nine questions, concerns the satisfaction of teachers with aspects related to the application of and interest in ICT. The latter, structured into eight questions, is centered mostly in the level of satisfaction concerning the organizational and management factors of ICT for their use in the C.P.R. Teachers had to answer each question by assigning it a unique value between 1 and 5, with 1 representing dissatisfaction and 5 high satisfaction.

Moreover, at the end of the sub-scale an additional item of similar nature was added, which measured the general degree of teachers' satisfaction, both personal and professional, with ICT. This question was analyzed independently and was not included in any of the previous scopes of the questionnaire. Table 2 highlights the key issues of the study and the code used to identify them in their analysis.

Table 2. List of items of the sub-scale ERPNT-4

TEACHING SCOPE	
CODE	DESCRIPTION
IANT	STUDENTS' INTEREST IN ICT MAKES YOU FEEL...
IANTA	STUDENTS' INTEREST IN ICT AS A LEARNING TOOL MAKES YOU FEEL...
IACL	STUDENTS' INTEREST AND GENERAL ATTENTION IN CLASS DUE TO ICT MAKES YOU FEEL...
MANT	THE IMPROVEMENT OF STUDENT LEARNING DUE TO ICT MAKES YOU FEEL...
MDNT	THE POSSIBILITY OF IMPROVING YOUR TEACHING WITH THE USE OF ICT IN WHAT CONCERNS METHODOLOGY, SELECTION, ORGANIZATION AND PRESENTATION OF CONTENT AND OTHER CURRICULAR ASPECT MAKES YOU FEEL...
RPNT	THE PROFESSIONAL RELATIONSHIP WITH THE COLLEAGUES OF OTHER CENTERS, POSSIBLE THANKS TO ICT, MAKES YOU FEEL...
EPNT	THE POSSIBILITY OF PERSONAL AND PROFESSIONAL ENRICHMENT DUE TO THE USE OF ICT MAKES YOU FEEL...

TEACHING SCOPE	
GTNT	THE IMPROVEMENT IN THE MANAGEMENT OF DAILY WORKING TIME DUE TO ICT MAKES YOU FEEL...
SNTD	IN GENERAL, THE DEGREE OF SATISFACTION THAT THE USE OF ICT GIVES YOU IN PERFORMING YOUR TEACHING WORK IS...
SCHOOL ORGANIZATION SCOPE	
CODE	DESCRIPTION
GPNT	THE EXTENT OF THE PRESENCE OF ICT IN YOUR EDUCATIONAL CENTER MAKES YOU FEEL...
SONT	THE ORGANIZATION AND MANAGEMENT OF ICT IN YOUR EDUCATIONAL CENTER MAKES YOU FEEL...
PMNT	THE BUDGET OF THE EDUCATIONAL CENTER ALLOCATED TO FOSTER THE PRESENCE AND MAINTENANCE OF ICT MAKES YOU FEEL...
SMTEA	THE POSSIBILITIES OFFERED BY THE ORGANIZATION AND MANAGEMENT SYSTEM OF ICT IN YOUR EDUCATIONAL CENTER FOR IMPROVING THE TEACHING–LEARNING PROCESS MAKE YOU FEEL...
RTMEA	THE TECHNOLOGICAL RESOURCES AT YOUR DISPOSAL (E.G. COMPUTERS, NETWORK CONNECTIONS) IN THE CONTEXT OF THE TEACHING – LEARNING PROCESS MAKE YOU FEEL...
ODANT	THE ORGANIZATION OF THE TEACHING STAFF OF YOUR EDUCATIONAL CENTER TOWARDS THE FULL USE OF ICT AT YOUR DISPOSAL MAKES YOU FEEL...
OTANT	THE TIME-MANAGEMENT POLICIES IN YOUR EDUCATIONAL CENTER TOWARDS THE FULL USE OF ICT MAKE YOU FEEL...
SOENT	IN GENERAL, YOUR DEGREE OF SATISFACTION TOWARDS THE ORGANIZATION OF ICT IN YOUR EDUCATIONAL CENTER IS...
GENERAL SATISFACTION CONCERNING THE MANAGEMENT OF ICT IN THE EDUCATIONAL CENTER	
CODE	DESCRIPTION
SGNT	IN GENERAL, YOUR DEGREE OF PERSONAL AND PROFESSIONAL SATISFACTION WITH ICT IS...

Source: own research

The ERPNT was forwarded to the teaching staff of the 126 C.P.R. by post, along with a stamped envelope for returning the answer and a letter detailing the particularities of the study and administration of the questionnaire. A total of 217 surveys were received in response, from 68 of these educational centers. This constitutes a response rate of 53.97% and a representative percentage, therefore, of all the surveyed schools.

In all the provinces participation ranged from 38.3% to 100%, which makes the sample statistically representative at this level by surpassing the 30% minimum that the contemporary scientific literature on the topic advocates (Abad & Vargas, 2002; Sánchez, 2007; Latorre et al., 2003; Cardona, 2002). Concerning the number of the teachers that participated in the study, it amounted to 217 (53.97% of all Andalusia), a number slightly inferior to the one obtained by Corchón (2005), who, in similar conditions, was able to study 255 professionals.

On receiving the answers from the study sample, the data from the surveys were processed through the elaboration of a matrix of 217 rows by 127 columns in ASCII support, using version 20.0 of the SPSS statistics software. For data treatment, the following approaches were used:

- *Analysis of Frequencies and Average of Items:* The calculus of the absolute and relative frequencies of the answers to each of the items of the ERPNT-4 sub-scale was carried out, as well as the determination of its arithmetic mean and typical standard deviation.
- *Analysis of Pearson's χ^2 Contingency:* Used in order to verify the possible existence of statistically significant differences between the levels of satisfaction of the surveyed teachers according to their gender and age. The confidence level assumed for the interpretation of the bilateral asymptotic significance was 95% (Lilliefors test, $\alpha = 0.95$, $p < 0.05$).

Some of the most relevant results obtained from the necessary analysis of the data can be found in the following section.

3. Discussion

For the treatment of the data, the calculus of the most common statistical parameters was carried out, as stated before, concerning the answers obtained for each item of the ERPNT – 4 scale (absolute and relative frequencies, arithmetic mean, standard deviation). Table 3 presents these findings.

Table 3 points out, for instance, that the levels of moderate or high satisfaction are higher in all the variables that constitute the teaching scope (IANT – STND), being the influence of the ICT in the improvement of the relationship with colleagues of other centers (RPNT) the one that, nonetheless, less pleases these teachers (47.6%) and causes more indifference (39.4%).

The aspects that, on the other hand, satisfy them the most, are the ones related to the potential of ICT for the improvement of teaching in aspects such as the methodology, selection, organization and presentation of content (MDNT). In

Table 3. Mean and frequency analysis of the items of the ERPNT-4 scale

ITEMS	HIGH DISSATISFACTION		MODERATE DISSATISFACTION		NO SATISFACTION NOR DIS-SATISFACTION		MODERATE SATISFACTION		HIGH SATISFACTION		ANALYSIS OF MEANS	
	N	%	N	%	N	%	N	%	N	%	\bar{x}	σ_x
IANT	3	1.4	8	3.7	36	16.6	113	52.1	54	24.9	3.97	0.83
IANTA	6	2.8	8	3.7	48	22.4	110	51.4	42	19.6	3.81	0.88
IACL	2	1	11	5.3	55	26.6	99	47.8	40	19.3	3.79	0.84
MANT	5	2.4	6	2.9	53	25.4	109	52.2	36	17.2	3.79	0.84
MDNT	4	1.9	8	3.8	25	11.8	120	56.6	55	25.9	4.01	0.83
RPNT	14	6.7	13	6.3	82	39.4	70	33.7	29	13.9	3.42	1.02
EPNT	3	1.4	4	1.9	29	13.6	108	50.7	69	32.4	4.11	0.8
GTNT	3	1.4	8	3.8	47	22.4	106	50.5	46	21.9	3.88	0.84
SNTD	3	1.4	3	1.4	40	18.9	130	61.3	36	17	3.91	0.73
GPNT	34	15.9	42	19.6	52	24.3	75	35	11	5.1	2.94	1.17
SONT	26	12.3	47	22.3	67	31.8	57	27	14	6.6	2.93	1.11
PMNT	33	15.7	55	26.2	59	28.1	54	25.7	9	4.3	2.77	1.12
SMTEA	21	10	50	23.8	70	33.3	61	29	8	3.8	2.93	1.04
RTMEA	50	23.5	56	26.3	40	18.8	57	26.8	10	4.7	2.63	1.23
ODANT	30	14.3	48	22.9	78	37.1	48	22.9	6	2.9	2.77	1.04
OTANT	37	17.5	53	25	68	32.1	48	22.6	6	2.8	2.68	1.09
SOENT	28	13.2	54	25.5	69	32.5	55	25.9	6	2.8	2.80	1.06
SGNT	5	2.4	13	6.3	40	19.2	124	59.6	26	12.5	3.74	0.85

Source: own research.

this item, the proportion of individuals that are satisfied to some degree reaches 82.5%. Likewise, the opportunity for personal and professional growth that the use of these tools encompasses (EPNT) was considered by 83.1% of the respondents as moderately or highly satisfactory.

Nonetheless, in opposition to these results, the levels of satisfaction concerning school organization (items GPNT – SOENT) actually drop to evident dissatisfaction. This happens when we consider the technological resources available in the C.P.R. meant for the Teaching – Learning processes of the students (RTMEA), in which almost half of the individuals surveyed (49.8%) is moderately or highly unsatisfied. The same also happens in what concerns the scheduling management in these centers for taking full advantage of the potentialities of ICT (OTANT), viewed negatively by 42.5% of the teaching staff.

More precisely, the two items better valued by the rural teachers of Andalusia in what concerns the organizational aspects are the degree of presence of ICT in the centers (GPNT), with 40.1%, and the possibilities that the current management system of these technologies bring towards the improvement of the Teaching – Learning process of students (SMTEA), with 37.8%. Nonetheless, even in these aspects, the level of dissatisfaction is visibly higher than in the items related to the teaching scope.

On the other hand, in what concerns the general satisfaction of these teachers with the activity and presence of ICT in their centers (SGNT), 72.1% find themselves moderately or highly satisfied with the role that these tools play in their schools, in opposition to the remaining 27.9%, of whom only 8.7% show moderate or high dissatisfaction versus the indifference of the remaining surveyed teachers. This points out that, to a large extent, in the C.P.R. of Andalusia the use of ICT has been welcomed by the professionals in what concerns educational tasks. Of marked importance are the new possibilities for the carrying out of work-related tasks and the professional growth that these technologies enable, although the teachers still worry about their degree of presence or the technological endowment in these institutions.

Despite what has been presented so far, the contingency analysis is carried out all the same, motivated by the necessity to determine the existence of statistically significant differences in the levels of satisfaction studied in function of the gender and age of the surveyed teachers. In that sense and, following the above-mentioned research methodology, for each item of the subscale ERPNT – 4 the value of Pearson's χ^2 non-parametric statistics was computed, as well as its p -value for the bilateral asymptotic significance of the Lilliefors results, with a confidence level of 95% ($\alpha = 0.95$, $p < 0.05$).

4. Conclusions

From a general perspective and, according to the results obtained from the application of the appropriate statistical indicators, the following are the most significant conclusions of this study:

- Teachers of the C.P.R. of Andalusia are largely satisfied (72.1%) with the level of presence and role of ICT in their own centers. Only a scarce 8.7% of the surveyed individuals shows a manifest dissatisfaction concerning this topic;
- Concerning the teaching scope, although the scores are fairly high in almost all the items, two stand out particularly: (1) the satisfaction concerning the possibility of improving teaching through the use of ICT in aspects such as planning, content organization and other curricular aspects, confirmed by more than 82.5% of the surveyed individuals; and (2) the possibilities of personal and professional growth that the teachers see, with the use of ICT in the classroom, supported by 83.1% of the sample;
- In what concerns school organization, average satisfaction scores are lower, showing a generalized level of moderate dissatisfaction in the large majority of the items. Of these, the technological resources available in the center to be used in the teaching–learning process and the efficient scheduling of resources for the full use of the ICT potentialities present the lowest values (49.8% and 42.5% respectively). The aspects of the dimension that the surveyed teachers are most satisfied with are, on the one hand, related to the possibilities that the organization and management system of ICT offers towards the improvement of the teaching–learning process, confirmed by 37.8% of the sample. On the other hand, 40.1% of the individuals valued the degree of the presence of these technologies in the center. It must also be pointed out that there is a group of teachers who, in a general way, feel neither satisfied nor dissatisfied concerning these questions. The percentage of this group ranges from 18.8% to 37.1%;
- With respect to the existence of statistically significant differences, their largest number was found in the teaching scope in which, by gender, the women are more satisfied than the men concerning the interest of students in ICT as a way of learning. Considering their age, the teachers aged between 31 and 50 are the ones that feel more satisfied with the possibilities that these technologies bring to their daily work, but also with how much these technologies contribute to the establishment of professional relationships with colleagues of other C.P. Rs. In the scope of scholar organization, differences could only

be found when analyzing genders separately: despite a certain division of opinions, the women are slightly more satisfied than the men concerning the management of ICT in their centers. Nonetheless, this difference, to a large extent, is due to the large proportion of the women who feel neither satisfied nor dissatisfied: a proportion that is higher than in the remaining questions.

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