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## ***ICT and in-service teachers' training: numbers and trends***

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### ***Abstract***

This article presents some results of a national study developed in 2004, in Portugal, on the characterization of ICT in-service teachers' training, offered by training certified institutions supported by PRODEP (Program for Educational Development in Portugal).

“ICT AND IN-SERVICE TEACHERS' TRAINING: A NEW REALITY INTERPRETATION” is a research study that quantified the accomplished courses from 2000 to 2003, as well as their length and audience.

It also tried to collect signs of the evolution of ICT teachers' training, regarding course type and mode, topics, expectations and evaluation.

This study proved to be quite encouraging, not only for the conclusions we came across but also for the recommendations we considered judicious to leave, concerning ICT in-service teachers' training.

### ***Keywords***

ICT; Teachers' training; Curricular development; Informatics literacy; Informatics alphabetization; Practice; Education; Training courses.

## 1. AIMS, STUDY CONTEXT AND METHODOLOGY

In 2004 we carried out a national study in Portugal with the aim of knowing and characterizing ICT in-service training offer for the basic and secondary educators and teachers, made by the training certified institutions supported by PRODEP (Program for Educational Development in Portugal)

The study goal was to update the available data of a previous research, taking into account, this time, the years 2000 to 2003. That's why we opted for a quantitative methodology, through a questionnaire which was launched by ordinary mail, and by an on-line form to 333 institutions, that constituted the universe of our study, distributed by categories, according to the table below:

Population			
Categories	Description	Number	%
CFAE	School Associations Training Centres	206	62%
IES	Higher Education Institutions	44	13%
Other	Syndicate, Professional and Other Associations	83	25%
<b>Total</b>		<b>333</b>	

We received 173 answers to the sent questionnaires which constituted our sample.

The numerical data, obtained by means of close questions, were analysed with the help of the spreadsheet, being then presented under the form of tables, syntheses and graphs. The open questions were then submitted to content analysis and they were organized according to large categories.

Besides quantifying the accomplished courses, the length and the involved audience, the study also tried to gather the indicators of the evolution that took place as far as course type and option, themes, expectations and training evaluation are concerned.

Finally, in the conclusions we tried to identify some relevant patterns and we left a set of recommendations for ICT in-service teachers' training.

A complete version of this study is available on the site of Nónio Program at [http://www.dapp.min-edu.pt/nonio/estudos/Versao\\_final\\_estudo\\_Form\\_Con\\_Prof.pdf](http://www.dapp.min-edu.pt/nonio/estudos/Versao_final_estudo_Form_Con_Prof.pdf).

## **2. TEACHERS' TRAINING AND PROFESSIONAL DEVELOPMENT**

### **The ICT in education**

Building new learning with the help of ICT implies cultural changes which may break through mechanistic paradigms that are still today characteristic of our school systems. According to Figueiredo (2000: 79), “as the construction of knowledge becomes more and more a process of exposition to multiple learning opportunities, this exposition becomes a cause of a growing cognitive surplus, or even the total lack of references”. Therefore a new role for schools and teachers emerges, namely as far as the building of learning environments is concerned – where the ICT constitute an integrant meaningful part. These learning environments are favourable to the development of meaningful learning, when they are part of challenges that only the teacher can face.

As the author suggests, “the overcome of this overload demands school and teacher contextualization processes, as the partition of knowledge makes possible to understand one thing at a time, although simultaneously it denies contexts. So, in an immense ocean of information, we pay attention to contexts that, to a large extent, provide structure” (2000: 79).

To beat the dichotomy content-context, Figueiredo (2000: 80) proposes the reconciliation of both, underlining that “the curricular development may turn into a reflexive project, of cultural change and reinforcement of a new paradigm, which, in a way, reassures the theory that attributes the teacher an active role in the curriculum design”.

This way, the task accomplishment and the construction of supporting materials to the contextualized use of ICT, either for activities in the classroom or for the New Curricular Areas (NAC), Resource Centers, Clubs and other pedagogical environments at school, constitute a privileged area of intervention, converging to some goals of the Curricular Reorganization of Basic and Secondary Education, from which we must withdraw the due implications on teachers' training.

### **Implications for teachers' training**

Referring to some orientations for teachers' training , the document “Action Strategies - the ICT in education” published by the Ministry of Education in March 2002, pointed out as guide lines:

- curricular contextualized training that emerges from teachers' identified needs, what reinforces Figueiredo's concerns (2000);

- the development of training modes that may favour a major implication of the trainees in the definition of their own training routes;
- the advantage of emergent potentialities of distance learning platforms.

In such an area of rapid evolution as the ICT, namely through the birth of new and more flexible computer tools for education, the concerns about updates and teachers' training assume a leading role. But, what kind of training are we discussing? Is there any contradiction between what is assumed as training and the idea of teachers' professional development?

### **Training versus professional development**

Teachers' training has been very often understood as a set of courses which teachers attend more or less actively, being expected great changes to take place, as far as their competences and practices with their students are concerned.

Nevertheless, research about teachers and their practices, has been showing more and more that the training courses are just a small part of what is understood by professional development which is a lifetime process. In literature, the professional development of teachers is realized as a process of personal and professional growth as for their competence towards their teaching practices, which is favoured by reflexive processes within collaborative contexts that emerge from their daily practice.

Santos & Ponte (2003: 3) state that “(...) professional development may draw on professional collaborations (projects, explorations, reflections...) and participation in the professional culture (meetings, conversations, readings...) as well as on formal and informal teacher education opportunities. (...)”.

Lúcia Oliveira (1997: 102) also agrees that “(...) the teacher and his/her way of intervention is not disconnected from what he/she is as a person. The representation the teacher builds of himself, as a person and as a professional seems to influence his/her professional development (...)”.

So, this leads to the identification of teachers' training needs, from their natural working context, trying to implement training modes like workshops, study circles or projects being complemented and valued, today, by distance training processes.

On the other hand, in Portugal, ICT in-service training has followed two major purposes:

- informatics literacy - teachers contact with the Office tools and other multimedia products;
- curricular integration (disciplinary and interdisciplinary), rising from the emergent problems of epistemology of each subject and/or from the didactics, tries to contextualize the use of specific computer tools for different knowledge areas, in the non-disciplinary New Curricular Areas (NCA) or in any other pedagogical background, such as Laboratories, Clubs, or Resource Centres.

Although the first one still goes on being the leading training paradigm, effects are already felt, as a result of the development of national ICT programs on education, such as MINERVA project, Nónio – 21st century program and the project of primary schools support on the educational use of Internet, integrating both perspectives, getting them closer and intertwined.

This is possible on account of the research that has been made, the examples of good practice divulged in *scripto*, and digital form, and the production, experimentation, and evaluation of materials resulting from in-service, specialized and after-graduated training courses.

According to the second point of view, training can be understood as a shuttle process, between the course sessions, support and collaborative work, between school colleagues and/or through distance communication channels, where the idea of project is always present.

This working process has allowed a slow but progressive appropriation of technology, the loss of “fears” and the discussion of problems emerging from classroom management, with its knowledge and power relationships, which come up when *risks* and the unforeseeable quality of innovation are assumed, as it is the case of ICT training.

To value teachers’ productions, divulging them in *scripto* and digital form, as CDs or on the Internet, as well as the examples of good practice, seems to contribute for their professional development process.

### 3. RELEVANT EMERGENT FEATURES

#### Why include ICT in the programs of the training entities?

Among the results that emerged from the data analysis, we considered relevant those concerning the ICT role on the training plans of institutions, the evolution of the training modes and their impact, according to different typologies, as well as the factors that contributed to a successful training, according to the institutions’ opinions.

The institutions were asked to mark in the questionnaire, among 5 items, the reasons for integrating ICT training courses in their annual training plans, and the obtained results are stated below.

Concerns and reasons	Nº	18%
Use ICT in different contexts	53	18%
Use ICT in school administrative tasks	19	20%
Apply new uses of ICT in the educational context	117	40%
Total	288	

The reasons for the integration of ICT courses in the training plans that were more often mentioned were clearly the exploration of new ICT uses in educational context (40%); this can be understood as a concern of keeping pace with new products and recent developments of ICT, so that they can be integrated in the educational daily routine.

This perspective, together with the figures, also meaningful, of the use of ICT at school and in curricular areas (respectively 20% and 18%) constitutes, in our opinion, a hopeful result, as the informatics alphabetization of teachers, with no educational context, starts to lose importance.

When we analyse the results, according to three defined categories of training institutions (CFAE, IES and Others)<sup>11</sup>, the pattern is essentially the same, just with a minor indication of IES as for the first reasons (ICT alphabetization and its use in administrative tasks).

### Evolution of ICT training courses, according to typology (type 1, 2, 3 4)<sup>12</sup>

The different institutions were asked to point out the number of courses a year and the amount of training hours of each of the four types of categorized courses present in the questionnaire.

For a further understanding and a better perception of the evolution of different training typologies we analysed the variation rate between 2000 and 2003, which is shown below.

Variation Rate between 2000 and 2003		
	Courses	Hours
Type 1	7%	22%
Type 2	36%	57%
Type 3	45%	53%

11 CFAE = Training Centres of School Associations; IES= Higher Education Institutions; Other= Syndicate, Professional, and Other Associations

12 **Type 1**= Use of general tools and Internet; **Type 2**= Application tools to education in different domains like administration, management and school assessment; **Type 3**= Application tools to education in different fields like multi and interdisciplinary projects, curricular (not disciplinary) initiatives (resource centers, clubs, school papers, webpages); **Type 4**= ICT in disciplinary curricular courses

Type 4	14%	46%
<b>Total</b>	<b>14%</b>	<b>29%</b>

The table above shows the progressive growth, both of the number of courses, and of the number of training hours. This one is higher, probably because of the production of longer courses.

Anyway, it's clear that the growth occurred from 2000 to 2003, both of courses and of hours is soft (respectively 14% and 29%).

On the other hand, it is obvious that the growth of type 2 (application tools to education in different domains like administration, management and school assessment) and type 3 courses (application tools to education in different fields like multi and interdisciplinary projects, curricular initiatives) is higher, 36% and 45% respectively, taking into account the number of courses.

Type 4 training (ICT in disciplinary curricular courses) increases at a pace which is more than the double of the growth registered in courses of type 1 ("package" ICT), although rather inexpressive as absolute value.

There is, however, a training feature, constituted by courses focusing on learning programs of general use (referred to in the study as type 1 courses) that still goes on presenting a strong incidence. As a matter of fact, there is still a meaningful percentage of teachers that go on asking for ICT alphabetisation.

### Impact courses and reasons

We tried to understand the perception of the training institutions on the impact of training on teachers, so we asked those institutions to point out three courses that, for some reason, had been considered relevant in the full amount of the accomplished training.

According to the nature and diversity of the courses considered of more impact by teachers, we decided to group them, following the typology adopted previously (type 1 to 4), for an easier analysis and comparison.

The table below synthesizes the information relative to the referred courses.

The data, relative to the institutions' opinion about the factor of greater impact on the success of ICT training, were grouped, after being analysed, according to the items shown below.

Type 4	22
<b>Courses – Impact on teachers</b>	
Type 1	173
Type 2	13
Type 3	197

According to the institutions' responses, it's obvious that type 3 training is considered to have more impact on teachers, which seems to be a hopeful indicator, although type 1 training still goes on having a strong impact on teachers too, leaving behind the activity contextualization of ICT use.

### Success factors of ICT training

The data, relative to the institutions' point of view about the factor of greater impact on ICT training, were grouped, after being analysed, according to the items shown below.

ICT training factors of success	N°
To improve teachers' pedagogical practice and professional performance with the use of ICT in educational contexts	24
Trainers' quality	22
Teachers' needs to get ICT knowledge	15
Motivation / trainees' adhesion	9
Practical quality of ICT training courses	8
Others	26

The answers seem to show the concern relative to the integration of ICT in teachers' pedagogical practice and the role ICT can play, as far as the improvement of this practice is concerned.

On the other hand, it is also relevant the opinion stated about the trainers' quality, as one of the greatest success training factors, on account of the decisive role they can play, as far as activity contextualization, as well as the way trainees get involved and acquainted with training contexts.

The item "others" presents a very scattered amount of reasons. Some of these reasons refer to the importance of the production of informatics materials to be used in classroom contexts, the decentralization of training in different schools and the proximity of the training place.

Other success factors were also referred, as the trainees' contact with the most recent research presented during the training time, and the existence of appropriate rooms, well equipped, at the rate 1 computer / 1 trainee.



#### 4. CONCLUSIONS

The leading concerns of training institutions, as far as the conception of their ICT training plans, seem to be:

- the improvement of teachers' professional performance by using ICT in educational context.
- The trainers' quality and its importance, according to training activity contextualization and teachers' involvement.
- schools and teachers' auscultation about choices to be made, in order to define their annual training plan.

As far as the accomplished training, institutions focus on competence development of teachers, aiming at the integration of ICT in educational context, neglecting learning about technologies as an end in itself. However, as training is an individual choice, there is still a preference of training courses and a high incidence on learning programs of general use (73% of the total number).

There are some indicators about training options adopted by the institutions, according to some recommendations of studies and official documents of strategic orientation which reveal a progressive tendency of growth (19%), concerning the option *Training Workshops*, which is more adequate to contextualization activities of educational use of ICT. The options *Study Circle* and *Project* register an increase, but still with no significant meaning in the amount of training offered by the consulted training institutions.

The number of trainees, by teaching level, presents slight variations, in each of the considered years, although with a growing tendency. The exception to this growth takes place in the primary school level that decreased in 2003 about 13%, comparing to 2000. This situation may be partially explained by the development in 2003 of a national specific training project in the classroom, related to the educational use of the Internet in this school level.

The data mentioned by the institutions about training activities presenting *distance training* features reveal a certain difficulty of interpretation. The ICT distance training activities indicated by the institutions are still inexpressive and may be just an indicator of a tendency of encouragement to this kind of training. There must be a clarification of the concept of distance training, for the certified in-service training.

Comparing with the data of the previous study, the number of ICT trainers, relative to the total number of trainers, has increased more than the double. This isn't necessarily a result of the increase of ICT training; it may indicate that there are more specialized resources according to the specific topics, which leads to a greater need of human resources with diverse skills, but with fewer activities/hours attributed to each one of them.

On the other hand, the qualification level of ICT trainers has been improving in a very meaningful way, with 68% of the internal trainers possessing after graduation training as Master's or Ph.D. Degrees.

## 5. RECOMMENDATIONS

The study leaves a few recommendations, some of which we include in this article.

Training modes, contents and methodologies have to go on changing, so that trainees may be more deeply implicated in the definition and organisation of their training achievements.

Assisted training modes must be articulated and complemented by distance training experiments, supported by online tools, such as practice communities, where trainees may find supporting materials and communication devices, to provide the share of ideas and materials and the interaction with other teachers.

It's urgent to overcome the barriers concerning the lack of skilled staff of technical support in training institutions and schools, so that equipments may be maintained and problems may be solved.

It's important that training institutions allow equipments to be available for trainees, after formal training, and it's also quite necessary to have supporting teams to prepare and attend to the first experiments with ICT in the field.

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