# Stakeholders' perceptions of the use of ICT in the education of students with SEN

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**Abstract:** Portugal is experiencing a technological reform in education. Technological refurbishing of schools and training of students and teachers is a reality on the rise, enhanced by the implementation of the education technological plan (ETP), which also aims at computer skills certification, by 2010, of 90% of teachers. In a school that must be adjusted to all pupils, special educational needs cannot be neglected and the nature and constitution of its computer resources should obviate the support of these students. Stakeholders' awareness and ICT training is essential to benefit all students from ICT use. In the case of SEN, this need for training is of paramount importance to establish itself as a facilitator for these students. ICT coordinators are the visible face of ICT implementation in schools; their functions include the management of the schools computer facilities and to zeal for the ICT training of fellow teachers.

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# 1 Introduction

The technological dimension of the world that we inhabit, which cannot be ignored, is immeasurable, with ramifications in almost every aspect of daily life and consequently of education. A multiple nation survey undertaken by Twining (2007), reinforces that besides many differences encountered, there is an agreement that ICT should be used in order to prepare people for living in a society permeated with technology.

Children grow up today in environments highly mediated by technology, particularly the audiovisual and digital (Sancho and Hernández, 2006). Valente and Osório (2007) stress that children are attracted by technology in an almost impulsive way. However, in sequence, Valente and Osório (2007) point out that this aspect is not always taken into account by the school to integrate it into learning, despite ample warnings from researchers.

The scant training in the use of ICT in pre and in-service teacher education programmes is one of most often cited barriers to the use of technology in the classroom (GEPE, 2007; Sancho and Hernández, 2006; Paiva, 2003; Brodin and Lindstrand, 2003; Colburn, 1998 cited in Hasselbring and Glaser 2000).

On the national scene, new school and teachers' roles are currently being discussed along with the concerns and implications underlying the level of teaching strategies and teacher training in the educational use of ICT. The Portuguese Government's Education Technological Plan (ETP) seeks to "put Portugal among the five European countries with the most advanced level of technological modernization in teaching" (PTE, 2009).[1]

Launched in 2007, the ETP is assumed as a means to (Portal of Education, 2008):

- improve education and educational achievement of students

- promote equal opportunities in the access to technological equipment

- modernise schools, allowing teaching establishments to operate in networks and teachers to work collaboratively
- it has the fundamental goals of:
  - connecting all schools to high speed broadband internet (all schools with a connection of at least 48 Mbps)
  - achieving a ratio of two students per computer
  - training and certifying 90% of teachers in information and communication technologies.

With the implementation of the ETP, where one visible aspect is the distribution of computers at no (or low) cost to elementary up to secondary students and teachers, much is debated about the pros and cons of technology in schools. When over 1,198,930 computers have been distributed and Portugal ranks third in the use of mobile broadband, the specific case of the use of technology with SEN students raises relevant issues for discussion: When will the implementation of specific technologies to support students with SEN take place? What is the priority given to training in ICT to meet special teaching needs of staff with responsibility in putting ETP into practice? Are professionals with operational responsibility in ICT, knowledgeable of their educational potential and aware and informed of the opportunities these tools can provide to students who struggle with learning problems? Are they making efforts to provide special education colleagues with the necessary skills to use ICT in the education of students with SEN?

The inclusive school that modern educational systems advocate does not concern only students with SEN but all those involved in their path. It requires a school for all and a school for each one. Indeed, this approach stresses that there's no need for specific schools, as each student should be incorporated in the regular classroom, with teachers of regular education, and attend the school closer to his/her area of residence.

The current legislation governing special education support, referring to the Declaration of Salamanca (UNESCO, 1994), considers that pupils with SEN should be able to pursue their learning in the least restrictive environment possible. This resulted into a growing challenge for any teacher, responsible for promoting learning experiences that are successful for any student. It raises the issue of teachers that, not being obliged to possess specific knowledge of special educational needs, must understand the nature of their situation and be prepared to receive and educate all students that come into their classroom. This issue acquires more importance as students with learning problems may not require special education services (Nielsen, 1999).

Recent changes in the Portuguese educational landscape, with urgent renovations at the level of technological innovation and the support provided to students with disabilities demand, in our view, to be investigated in further studies as to what extent these two branches are united in a common core for the promotion of access and educational success of students with special educational needs.

## 1.1   ICT and the education of students with special educational needs

It is unquestionable that the use of computers and technologies presents itself as an added value to the process of teaching and learning, not only by the possibilities of communication and innovative ways of transmitting knowledge but also for the huge motivational load that is triggered in a society immersed in technology. ICT is used

internationally as a way of widening access (Hodgkinson-Williams et al., 2007), efficiency and quality in education. A study conducted in 2007 by the International Institute for Communication and Development (IICD), revealed that 80% of participants felt more skilled for their exposure to ICT and 60% said the process of teaching, as well as of learning was directly and positively influenced by the use of ICT. The benefits that ICT can bring to the process of teaching and learning have been proven in several international and national studies, pointing to gains in terms of motivation and performance, and therefore attainment, and thus promoting its use (Gutterman et al., 2009; IICD, 2007; BECTA, 2007; Paraskeva et al., 2007; Balanskat et al., 2006). Jonassen, mentioned by Kerkiri et al. (2009) stresses that individuals differ in their general skills, aptitudes, learning styles and preferences for processing information, the way they construct meaning from it and apply it to new situations. Therefore, we must search for ways to accommodate their needs.

The advantages of using ICT in the education of SEN students are also substantiated by several studies (Balanskat et al., 2006; BECTA, 2007, 2003, Liu et al., 2007; Williams et al., 2006), reinforcing the benefits obtained by these students that tend to be exponentially higher when compared with pupils without SEN. In fact, it appears that when compared to traditional education, education assisted by technology conclusively proved to be more effective and efficient, primarily due to increased motivation by the interaction with the computer (Kirinić et al., 2009) that provides other possibilities for access and participation for these students. Ribeiro et al. (2009a) synthesise several studies that explore the inclusive potential of ICT. The studies and testimonies from teachers and from students with SEN corroborate a wide range of applications of ICT, either as assistive technologies (AT) or as educational tools, overcoming various difficulties these students encounter, that range from the most visible physical disabilities, to emotional and behavioural problems (Ribeiro et al., 2009a). Teachers, by their proximity to the educational process, are clearly defenders of the use of ICT in inclusive education. Several studies, particularly the surveys conducted by Benigno et al. (2007) with Italian teachers, and Brodin and Lindstrand (2003) with Swedish teachers, show recognition of the potential of ICT in fostering inclusion by 75% of the first set of respondents and of 79% by the second set.

Consequently, it is impossible to deny that ICT have numerous advantages for students with SEN, promoting equal opportunities and active participation in their learning process. As an AT, it can assist the overthrow of barriers in the access to education; as a pedagogical tool it can foster new opportunities and educational strategies that are more successful than the simple use of traditional teaching methods.

In a synthetic and general way, it is clear that ICT can assist the process of teaching and learning of pupils with SEN (Sparrowhawk and Heald, 2007) by:

- increasing motivation

- enabling or facilitating/improving access

- improving and increasing performance expectations

- facilitating differentiation

- providing alternatives

- promoting involvement in the real world

- facilitating monitoring and assessment by the teacher

- supporting administrative work

- supporting the connection with home and community.

However, the mere introduction of the computer in the classroom does not lead to automatic beneficial effects in the process of teaching and learning (Sancho and Hernandez, 2006; Paiva, 2003; Ponte, 1997 among others). It requires the implementation of teaching methodologies that leverage the great potential that ICT carries.

As mentioned above, at present with the ETP there is an urge to equip Portuguese schools with computers and associated technologies and to certify teachers in ICT. We can observe the emersion of directives, policies and projects with national and European funding that attempt to tackle the digital divide and lack of computer literacy, as well as to potentiate the use of ICT as a pedagogical tool. However, not all means are available and/or adapted to the real needs of students with or without SEN: not only to understand these resources as hardware and software, but also integrating the professionals who know how to actually extract benefits from the use of technologies in education.

At this point, we cite Costa (2007, p.15) that mentions:

> "Even when motivated to use computers and the Internet, teachers are faced with great difficulties, mainly because they didn't have specific and appropriate training to do so, hardly concretizing proposals that go beyond what they usually do with their students."

Ramos et al. (2007) mention that the presence of computers in schools will not foster their use because of lack of information and reduced attendance in ICT training.

At the national level, the information obtained from a European study by Korte and Hüsing in 2007 is of great importance, indicating that Portugal, along with Latvia, Lithuania and France, has teachers with fewer ICT training. The study 'Analysis of international reference models of technological modernisation of the education system', which analyses the use of computers by students and teachers in Finland, Ireland and Spain, presented by the Bureau of Statistics and Planning Education (GEPE) in May 2007, contextualising the Technological Plan for Education of the Ministry of Education, shows that the skills of Portuguese teachers constitute about 30.4% of the barriers to ICT use in the classroom.

In the specific case of support to pupils with SEN, the study by Ribeiro et al. (2009b) shows an obvious need for general training in ICT in particular, and especially in ICT SEN oriented training. This study also found that only one of 19 respondents was confident of his/her technological capabilities to use ICT to support pupils with SEN. The lack of adequate education and training has an impact that is particularly preponderant in students with handicaps and disabilities. ICT is often a crucial component of planning/implementation of educational programmes for these students (Hasselbring and Glaser, 2000). Abbott (2007) states that part of the problem frequently lies not on the non-use of technology but rather on its misuse. This may mean that a tool that was intended for inclusion can become an aggravating factor of stress, frustration and subsequently of exclusion. Accordingly, the training of those who work with SEN students should be seen as a priority in order to promote access and educational success of these students.

## 1.2   The ICT/ETP coordinator

The ICT coordinator 'emerged' by means of a 2005 government bill during the first technological equipping of schools, aiming to promote the use of differentiated technologies in education. Their need was identified in two main areas: to ensure the maintenance of networks and computer equipment to facilitate their effective use in teaching and learning; to assist the investment in training and to support teachers in ICT, enabling ICT use for teaching, non-teaching and administrative activities.

A bill from 2009 introduced the ETP coordinator and team, responsible for carrying out the functions formerly performed by a single element. This mandatory team has the task of putting into practice the ETP directives. The role of the ETP team coordinator is inherently exercised by the director but may be delegated to teachers[2] who meet the skills in educational, technical and management appropriate to the tasks of overall coordination of ETP projects.

Despite the change in name, at the operational level, the ETP coordinator keeps all the functions attributed to the ICT coordinator, that must enforce ETP directives: provision and maintenance of equipment, networks and internet; survey and meet the training needs of teachers and non-teaching staff in the school. These functions emphasise the crucial role the figure of the ICT/ETP coordinator plays in providing resources and promoting ICT use in the education of all students.

The tasks of the ETP coordinator and team should be carried out based on the development of an annual ICT plan. The ICT plan aims to promote the use of ICT in school and in non-teaching activities, taking advantage of the tools available and generalising its use by all elements of the educational community. This plan constitutes a tool with the purpose of structuring a range of activities that should be preferably transversal to other school activities in order to concretise the integration of ICT into learning environments, and in particular its curricular integration. It should involve objectives and activities in all schools and therefore include teachers and students of the various learning grades. It must be must be implemented in close coordination with the professionals' training plan. As a planning tool, the ICT plan should be preceded by a synthetic diagnosis that leads to the selection of a limited framework of objectives.

## 1.3   Research background

This study is part of a nationwide survey that has raised from the conviction that ICT as teaching tools or AT is an asset to the education of SEN pupils. It consists of a pilot survey, part of the main data collection instrument validation.

The ongoing research seeks to determine working conditions and training needs for the use of ICT with students with learning issues and aims to design a teacher training programme for 1st to 9th grade teachers, adapted to real training needs and appropriate to SEN contexts. Considering ICT as a unifying factor, we argue that those involved in this area are primarily special education and support teachers, whose mission is to support these students, and the ICT/ETP coordinators for their central role in the deployment of ICT in schools and the promotion of training of fellow teachers. Since ICT is often the only means by which SEN pupils have access to learning, the role of ICT/ETP coordinators is of paramount importance, as they can make a positive or negative difference on the use of ICT by these students because of their responsibility in the

management of the technological inventory of schools and in the ICT training of teachers who support these pupils.

A survey by questionnaire is the right choice for the collection of data from the idealised research. Questionnaire surveys are often used by researchers as tools for data collection and their interpretation assists and empowers the authorities to make informed decisions in designing various policies. Questionnaires transform information directly communicated by a person or subject into data and constitute a process to find more direct information about a particular phenomenon (Tuckman, 2000). The design has to do with a sequence of processes for obtaining an instrument to acquire reliable data that we seek to collect. It obeys to careful steps of validation among which is the pilot application, pre-testing or piloting, under conditions very close to those of the main study, ensuring proper data collection. In this context, data already illustrates the prospects of the population sample that collaborated, allowing the inference, with no intention of generalising from such a small number of respondents, about possible outcomes and outline the training needs in ICT applied to SEN.

Therefore, the questionnaire used here is very similar to the final one, so we concur with the perspective of authors such as Lanphear (2001) for whom the publication of results of pilot studies may contribute towards improvements in educational programmes. We believe that the data published here may stimulate discussion on the initial/continuous training of those who, in the course of their work, have to support pupils with SEN and provide them with tools that facilitate access and participation in their learning, promoting success rates, along with experience of citizenship.

## 2   Study

The digital questionnaire consisted of multiple-choice questions about professional behaviour and training needs on the use of ICT in the education of SEN students. The respondents were 13 ICT coordinators in office in July 2009 with experience of five to 36 months. Six of them were responsible for a group of schools and seven for single schools. It was self-administered, with respondents filling it out in a situation similar to that of the response to the final instrument, with only an added short interview to identify any final corrections and/or additions to the questionnaire.

### 2.1   Results

As regards with work experience as ICT coordinators, six respondents were in office from 25 to 36 months, four between 13 to 24 months and three between zero and one year, with a minimum experience of five months. As for teaching qualifications, three respondents had a degree in 2nd cycle education, six in 3rd cycle and secondary education. When asked if their basic training had addressed the use of ICT with SEN or AT, it was found that, in the first case, five of 13 coordinators had lessons on the use of ICT in SEN in their graduate course and two addressed the use of AT.

The analysis of the academic history of the respondents showed that four had a post-graduation/specialisation in a computing area, three of them had a Master's degree, and one of the computing graduates cluster a Master's and a post-graduation/specialisation in the area. However, when asked whether their specific training in the area had included content related to the use of ICT for SEN and AT, out of

the four respondents with degrees in computing only one had classes on the use of AT and of the three respondents with Master's, only one had some training in AT.

Concerning specific training in SEN, we observed that only one of 13 respondents had some training in the form of a seminar titled 'ICT and SEN' as part of their degree in information science and this was attended less than one year ago.

Regarding the interest about the use of ICT in the education of students with SEN, all respondents answered affirmatively (seven very interested; six interested). As to the scope of the ICT plan under their responsibility, only four (30.8%) respondents said that this includes the use of ICT by pupils with SEN, and, therefore, in nine cases (69.2%) the use of ICT by students with SEN is not foreseen.

As it relates to the equipping of the school groups/schools with technologies for SEN, the collected data shows that only three school groups/schools have software for SEN and three other school groups/schools have AT. Only one of the schools has both technologies. Also, in this subject, as regards to coordinators' perception of available ICT resources in national schools to support pupils with SEN, six respondents stated that schools do not have sufficient resources, five emit no opinion, one does not agree nor disagree and one disagrees. Associated with the questioning about existing equipment, the coordinators were also asked about the orders placed for acquisition of technologies specifically for SEN. In this matter it was found that only three had asked for AT and only one for software and the latter associated with both application.

Analysing knowledge of technologies especially designed to educate students with SEN, all respondents reveal they are outdated, or that they have no or reduced knowledge about them. In addition, one of the respondents stated that there is "a need to have a general understanding of the technologies in this area".

When questioned about their confidence of their educational and technological skills to help a pupil with SEN achieve the best possible results with the use of ICT, most of the ICT coordinators show a neutral position, not concurring with having high or low confidence in their own skills.

Regarding the need for training in SEN, 11 respondents stated they need more training and 12 more training in ICT for SEN. In this item, seven concretise referring motivation for training in this area. As regards surveying training needs in ICT for SEN, only one respondent stated s/he had already taken steps in this direction, but that there were no arrangements made for training in the schools under their scope.

Nationally, there are 25 ICT Resource Centers for Special Education (ICTRCE) for advice and support in the use of ICT in the education of SEN students. The majority of coordinators (ten out of 13) are not aware of the existence of these centres, two know about them but never consulted with them, and only one stated that s/he consults the centre a few times a year. As for their perceptions on the use of ICT, ICT coordinators in national schools believe that technologies are a tool for inclusion (11–84.6%) and therefore offer significant educational benefits for pupils with SEN (12–92.3%).

## 2.2   Discussion of results

These respondents' having an appetence for ICT it is not surprising to find that their belief on the potential of ICT to support pupils with SEN is evident. In the cases surveyed, there is a manifest lack of technological equipment for pupils with SEN in schools. It seems that, despite the few technologies available, very small steps to strengthen the supply of schools in this area have been taken. However, the lack of

equipment is only part of the problem as this also applies to insufficient qualified professionals who support students with learning problems. It was also possible to determine that these qualified professionals in the use of ICT in education in general show clear needs at the level of expertise to support pupils with SEN in the use of ICT. However, possibly mindful of their needs, they demonstrate motivation to overcome these problems, revealing that they need training in SEN and in the specific use of ICT as a tool for access to and participation of these students in learning. ICT/ETP coordinators are not the only human resources required to support students with SEN. This role is mainly intended for special education and support teachers with specialised training for the job. Nevertheless, the ICT coordinator plays an important role in the qualification and certification of ICT teachers and, in that respect, only in one case did we find a professional who was careful enough to survey the teachers from his/her schools about their need for training in ICT applied to SEN. Despite this survey, no respondent reported to have taught or organised training in the area.

The responses analysed, in our view, make us believe that the main problem lies on the awareness of the issues involved in SEN and the training of teaching staff that support these students. The respondents, although aware of the enormous potential of ICT, seem to adopt a position of contemplation, believing that teachers who specifically support SEN students already have the necessary training, an erroneous assumption already reported in several studies and recently in the study by Ribeiro et al. (2009b). Costa et al. (2006) consider that a general insufficiency in the training of teachers in the education of pupils with SEN negatively conditions the functioning of schools and activities in the classroom. We therefore agree with Martins (1991 cited in Carvalho and Peixoto, 2000), that "What is at issue is the doing, constantly seeking improvement, not to slacken their efforts on behalf of the force of inertia (...)".

## 3    Final considerations

The present study was conducted with a very small number of respondents so we can only infer their training needs and draw some lessons that can underlie a training programme without the pretension of major generalisations.

The inclusive perspective seeks a school for all and for each one requires an individualised and customised educational response to specific learning needs of each student. In a school that aims at inclusion, with the increasing presence of SEN pupils in mainstream classrooms, coupled with the certification of computer skills, the spectre of knowledge of any teacher should be extended to understanding the paradigm of inclusion underlying the comprehension of the particular needs of SEN pupils.

Concerning technological support for pupils with SEN, there are at present the efforts of educational authorities to centralise technology resources in specialised centres and extension of laptops distribution initiatives for pupils with SEN. Nonetheless, ICT adapted to special needs should be available in every school so that every student can attend the school nearer his/her home as if s/he would not have any special need. However, it appears that the necessary arrangements are not always made to ensure the use of ICT by pupils with SEN, either by insufficient acquisition of technology or by insufficient surveying and available training in the area. There is still a path to trail until this reality is met.

Respondents, given their position on the use of ICT in education, have a very positive attitude regarding its use with students with SEN. However, they seem to reveal gaps essentially at the level of awareness of the problem, with reduced pro-activity. In this matter, we consider, as many others that all teachers should change their practices so that all can get the best results possible in a school where everyone is expected to have a place.

The ICT/ETP coordinator appears as a central element in promoting the use of ICT by SEN pupils. S/he must retire from the role frequently imposed by their fellow teachers as "(...) computer engineer that tightens screws" (Ramos et al., 2007). S/he should rather take a proactive stance, also in signalling pupils with SEN, endeavouring to propose the purchase of computer equipment to facilitate the use of ICT by these students, consulting specialised agencies, surveying, ordering and promoting training specifically targeted for teachers that accompany these students.

In this perspective, associated with conceptual and practical training, we believe that training for ICT coordinators should first address an attitudinal component of information and awareness, and then technological knowledge and learning. Any training should start with the need for change at the level of mentality of the teaching staff and at the level of educational processes with SEN children in order to offer them the best possible education and learning adapted to their real needs (Ribeiro, 2008). Many authors consider the preparation of mentality, particularly of teachers for innovation and change processes regarding the altering of values and attitudes, one of the most important conditions conducive to the success of any educational reform (Ribeiro, 2008). When much is invested in training in the educational use of ICT, data collected in this study seems to indicate an inadequate approach to the potential of its use with students with SEN in initial and specialised training for professionals in ICT in education. The initial training of teachers significantly influences their future practice and is crucial to note that all teachers play an important role in the success of inclusive education. For its part, willingness to evolve and training are of great importance in the professional development of all staff. It assumes that a professional is never fully trained and must continually seek to fill gaps that prevent him/her from maximising the results of his/her actions.

In conclusion, aware of the fact that these measures are not just at the operational level of responsibility of the ICT coordinator, they should be moulded at an organisational level responsible for policies to equip schools and train teachers. We agree with the 1999 British Code of Practice of the Disability Act Discrimination (DDA), that failed to anticipate the need for an adjustment may make it too late to comply with the duty to make the adjustment. Similarly to this act, and defending the rights of all students to an education that must seek societal inclusion, we believe that the Portuguese education authorities should also impose the duty to timely anticipate the needs of students, making the necessary adjustments prior to their admission and, in particular, alerting to the fact that the allegation of lack of notice is not in itself an excuse. One must contribute to meet the needs of all students and teachers in order to fully profit from all the access and educational potential that ICT carries.

We therefore also agree with Trucano (2005) who, referring to the use of ICT in teaching, says that training is the key to technological innovation and teaching. Teacher education and the progressive development of relevant professionals are essential for the benefits of ICT investments to be maximised. Effective knowledge exchange between stakeholders is in order for learning and innovation to occur (Angehrn et al., 2009).

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**Notes**

1   The mission and objectives of the Portuguese ETP are available in: http://www.pte.gov.pt/pte/ PT/OPTE/index.htm.
2   Only in one case in this study, and for the 2009/2010 school year, the director undertook this position.