

# THE MAGELLAN PROJECT AND PORTUGUESE TEACHERS' PERSPECTIVES

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## ABSTRACT

This article discusses the limits and potential uses of mobile technologies in teaching, from the point of view of Portuguese teachers of compulsory education, with a special focus on "Magellan Project" laptop computers. This reflection was constructed from the analysis of group interviews, conducted with practicing teachers in the central region of Portugal. Some data were also obtained from an online survey submitted to about 50 teachers during training on this subject. The feedback from these interviews was analysed in order to justify the present report.

## KEYWORDS

Compulsory education, Learning strategies, Learning with ICT, Magellan project

## INTRODUCTION

The advance of technology restructured and redefined the role of socio-economic, cultural and educational ICT at all levels of social life. New forms of work, communication, construction, and socialization and also innovative approaches of developing knowledge mediated by ICT have been exploited in the last years. To understand this phenomenon in all its dimensions allows us to (re)construct other practices of teaching and learning. In the field of education, technologies contribute to (re)create different practices of teaching and learning as, in these contexts, the intellectual faculty is reorganized and new meanings are built. The place of intellectual work moves towards the construction of a new relationship with knowledge. It proposes a pedagogy that puts education at the intersection of knowledge and expertise, in an emergency as well as the multiplicity of the relationship between the local and the global. In this process training and the emergence of a new teacher with a different approach is essential because its role is crucial in contemporary societies and one of the keys to understanding their transformations.

This work aims at identifying and discuss constrains and potential uses of mobile technologies, according to the perspectives of Portuguese teachers of compulsory education mainly as far as the use of the laptop of the "Magellan Project" is concerned. The initial challenges and limitations on the use of mobile technologies represented by the computers in the classroom are outlined and identified in accordance with the experience and practices of those teachers. The role of ICT in school management, infrastructure and maintenance is addressed and furthermore the on-going training of in-service teachers, to build an effective educational practice, included in the daily school life. This work was based on the analysis of interviews, done with teachers in the central region of Portugal. Semi-structured focus-group interviews were applied to the respondents in this study. Complementary data were obtained from an online survey done to 45 teachers during training on this subject. The conclusions address the need for a more systematic and focused training about the use of ICT within the learning context in compulsory education and of a stronger awareness of teachers concerning these practices.

## ICT IN COMPULSORY EDUCATION

Technologies have an important role in society, affecting all the relations among citizens. As far as education is concerned, understanding this phenomenon in all its dimensions, is at the core of the (re)construction of new teaching practices and learning, since the substance of intellectual work moves to build a new relationship with knowledge. This relationship requires a pedagogy that puts education at the intersection between knowledge and experience, as well as the multiplicity of the relationship between those factors. In the process of training, the existence of a new teacher with teaching knowledge, trained on the basis of a different approach is essential because his/her role is vital in contemporary societies and it is also a key to understand all the changes in education (Tardif, 2011, p. 36).

The Magellan Project aims to guarantee access to information technologies and to promote info inclusion of students, since their very first years of schooling. It is a new phase of ICT integration in education with ambitious goals: i) to create a program that allows continued access to computers and the internet with special conditions for the educational community and ii) to promote and encourage the development of new learning practices to be implemented throughout the country.

The program addresses encouraging education with the help of advanced technologies considering the school as a privileged space for the promotion of equal access to the information and knowledge society. As it is the case in Latin America, "The one laptop per child project has aimed to create educational opportunities for the world's

poorest children by providing each child with a rugged, low-cost, low-power, connected laptop with content and software designed for collaborative, joyful, self-empowered learning” Biancoccine de Almeida & Assisi (2010:13).

For that propose, teachers have to consider computer equipment just like another input and resource to be used in learning activities. So, it is recommended and suggested that future teachers should use technology as students do, explore them and produce artefacts that may be used with their future students. Thus, future teachers must experience both uses relating to content and teaching practices, across all disciplines. The teacher should know that providing ICT in the classroom means knowing that if they are used interactively, they promote significant actions that result in knowledge, and increase multiple pathways for connections and expressions and new performances of manipulating information participating as co-authors of the learning process. If this kind of proceeding is adopted teachers will become more aware of the fact that the use of technology can enable much more student centred learning, where collaboration and also autonomy becomes the norm. When implemented in schools, the potential for ICT will make conventional approaches more redundant.

Independently of teachers' training and skills to use this computer, Sousa (2009) presents the strengths of the Magellan as the following: i) democratization of the computer; ii) excellent software package for Windows and iii) the opportunity to create a conceptual revolution in schools. As a weak point of the Magellan he points that this computer presents an insufficient adaptability to pupils with special educational needs. He also adds the statements of specialists in educational technology who highlight the importance of the project namely for being a very favourable environment for learning and a privileged means to increase the knowledge and exploitation of proficiencies with the computer. However, an important finding is that it is necessary to develop new skills in teachers and students to offer innovative challenges to the task of learning how to learn. On the other hand the fact that children can take the computer home may have a contamination effect on the older generations, which can be very significant in disadvantaged families. Almeida<sup>1</sup> and Costa<sup>2</sup>, cited by the same author, defend that bringing the generations together is an advantage. In contrast it can also have the opposite effect, that of increasing the gap between generations. This is why further studies on this point are needed in the coming years (Sousa, 2009).

## OBJECTIVES AND METHODOLOGY OF THE STUDY

This study focuses on the research about ICT practices of in-service Portuguese primary school teachers, namely as it regards the Magellan project, and their perspectives regarding the effects of the use of ICT in their teaching mission and in the learning and teaching processes. The intention of this study is to determinate teachers' practices concerning the use of ICT as well as to develop a deeper understanding of these issues. We expect to propose further contributions concerning the development and implementation of ICT adapted to the specific requests of primary education and primary teachers' training.

### Research questions

This study addresses the following research questions:

- a) What are the teachers' opinions concerning the Magellan project and the ways it may change their teaching?
- c) What are the teachers' perspectives related to the ways in which ICT may affect learning and teaching processes?
- b) What are the ICT current practices of Portuguese in-service primary teachers?

### Methodology

As far as methodology is concerned, this work associates a qualitative and a quantitative paradigm, it being mostly interpretive of the teachers' statements during the interviews, according to a list of indicators related to what, when and how they use the Magellan laptop during the learning and teaching process with ICT. On the other hand, as mentioned before, we will also present some results of a questionnaire previously answered by 50 primary school teachers, throughout a training course that also helped as an orientation to the stabilisation of the indicators.

As regards the first moment of this research a questionnaire about the use of the Magellan with five closed and open questions was applied to teachers who participated in a seminar whose subject was “ICT in Primary School: The new challenges” in the centre interior of the country. The questions were organized as follows: (i) do you consider that the use of the Magellan computer offers more advantages or disadvantages from the perspective of student learning?; (ii) do you consider that the use of the Magellan computer involves more strengths or

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constraints for teachers in their practice?; (iii) do you use or have you used the "Magellan" with your students in the classroom?

Concerning those three open questions, examples and comments were asked about the project: (iv) if your answer was yes, give an example (or more) of activities that you usually develop with your students with the Magellan; (v) make other comments about the Magellan. Those two sub-questions had the objective of better understanding what teachers do and what they think about the project to help the construction of the questions of the structured focus group interview. Questions about the Magellan were obtained as above, in the context of a survey required as an admission criterion to attend the workshop.

For the interviews some schools of the central costal area of Portugal were chosen, depending on teachers' availability to participate on the interviews and to be recorded for later transcription of their testimony for data treatment. The teachers from one of the schools, School A, do not use the Magellan for different reasons, so the object of the descriptive study was the teachers interviewed using the Magellan belonging to 2 schools of a rural area and 1 school of a city suburban context area. All teachers were interviewed, except one from a village school that was not present at the time. Table 1 shows the distribution and presents data from the identification of schools and teachers that practice with the Magellan and constitute the most important part of the corpus of this study.

Table 1. Schools and teachers interviewed

School	Characterisation	Number of teachers	Respondents
A	Village	2	2
B	Village	4	4
C	Village	3	2
D	City suburbs	8	8

The interviews with teachers were conducted in groups of 2 to 8 teachers each. The interviews lasted 50-60 minutes and were taped and/or video recorded with the consent of teachers and transcribed for analysis. The themes that guided the questions were: (i) training for ICT and for the use of the Magellan; (ii) how and when teachers use the Magellan; (iii) how do they plan the daily use of the Magellan (iv) experience in teaching practices; (v) research, use, production and supply of content; and (vi) knowledge, devices and use of computer programs and use of the Magellan. All the questions were tested in a pilot study and validated by two experts from the Department of Education of the University of Aveiro.

## RESULTS AND DISCUSSION

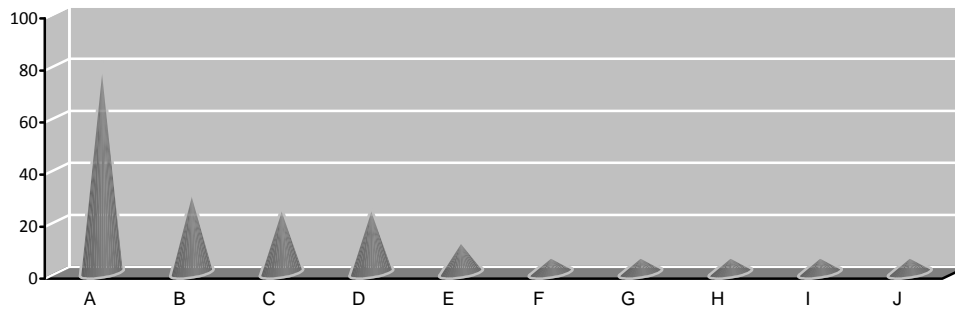
As far as the first moment of this study is concerned, altogether 45 teachers entered the online questionnaire related to the Magellan, 42 answered all the questions and 16 (32%) the open questions about the activities within this Program. The descriptive statistics data of the results shows that the largest number of teachers recognise the input that the use of the computer can bring to learning and teaching in terms of advantages and strengths but, in this context, there is still an important number of teachers admitting that they don't use the Magellan with their students.

Table 2. Open questions

Nº	Question	Answers		
		Options	Total	%
1	Do you consider that the use of the Magellan computer offers more advantages or disadvantages, from the perspective of student learning?	Advantages	40	80%
		Disadvantages	2	4 %
2	Do you consider that use of the Magellan computer involves more strengths or constraints for teachers in their practice?	Strengths	33	66%
		Constraints	7	14%
3	Do you use or have used the "Magellan" with your students in the classroom?	Yes	16	32%
		No	29	58%

Concerning the teachers using the Magellan computer in the classroom they state that it is mostly for activities related with A) text production (81%); B) photo stories (31%); C) eLearning activities (25%) and D) search for information on the Internet (25%). 12% of the teachers use it to solve E) digital or online exercises. Only 6% of the teachers admitted that they use the computers for other activities with students like F) classmate contact; G) the elaboration of presentations; H) the use of office tools or specific tools for I) learning drawing or J) programming (scratch). The distribution of this usage is represented in the following graph.

Graph 1. Percentage and activities with the Magellan



Vis-à-vis their opinions and suggestions they were predominantly associated to several complains about the Magellan project. As a matter of fact, due to the present economic situation, the delivery of computers was interrupted and schools and teachers desiring to use the Magellan can only do it if they have access to computers acquired by the school or owned by brothers of the students themselves. Other teachers refer that students and parents equate the small size of the computer to that of a toy and that it is not as rentable as it could be. Some respondents also mentioned that prior to the delivery of the computers, teachers should have received specific training on the use of this specific computer and its software.

As to the interviews, in this study we only consider the respondents that use the Magellan at school, a total of 14 teachers. They all received training in ICT, but state that they have not been prepared to work with the Magellan. Nevertheless in the schools considered in this study, there is one day for the use of the Magellan. Usually it is Fridays but it happens that it is also used at other times of the week. However a small percentage of teachers report that they use the Magellan every day, when its use is relevant for activities connected with the syllabus or other activities related with learning projects.

Concerning the learning and teaching planning for activities with the computer, they do it at home. No school has a schedule for planning or exchange experiences about the Magellan since the beginning of the project. Most activities focus on the Portuguese language classes, specifically on the production of texts, presentation of work and construction of stories. Most of the teachers do not produce any type of digital content with the exception of PowerPoint presentations. Till now they rarely provide this material to students and a few participants related that they use a network to access some specific programs and sites related to maths or science activities and exercises. Almost half of the respondents reported that they consider the Internet a problem and a risk to students because of plagiarism and form of distraction. Moreover, these participants do not trust the instructional potential of social networks.

As to the software that comes with the Magellan computer, most teachers state that they do not know how to use it. Although some colleagues claim that these programs (the specific ones for the Magellan) are very simple, such an explanation seems relevant to their daily routines in the classroom without ICT resources. But there are exceptions: one of the teachers that constantly uses the computer reports that *"My students use it every day. Before Magellan my students already used the computer. Computers were old and slow but since the first year they are familiarised to using the computer. Reading images, email, how to make power point, the letters... all day. They do grids, use Exel and make graphs in mathematics. They search and use all types of sites in the web for their work, and virtual learning environments. I implement a lot the use of the site Escola Virtual<sup>3</sup>, this platform has everything in the program"*.

This same teacher also has an interactive whiteboard in his classroom and he reinforces the importance of this technology on the quality of his classes. *"There is a big difference in classrooms with an interactive whiteboard and without it."* The importance of the interactive whiteboard appears in the speech of all teachers interviewed, both for teachers who have the interactive whiteboard in their classroom and for those who do not have this

<sup>3</sup> "Virtual School" - the name of a site for students and teachers

technology available, complementing the mediation of Magellan. According to these teachers: *"It is difficult to work with Magellan because to go through all the tables, (giving each student personalised support) is not stress-free"*. The interactive whiteboard, in their opinion, has an important role in this issue.

All participants agree that ICT and the Magellan contribute positively to popularize the technology at school for planning teaching and learning and they agree with Biancoccine de Almeida & Assisi (2011) and Sousa (2009) who refer the advantage concerning the generation gap: *"in these four years of use Magellan had a significant contribution. In school or at home, in the family, parents participate more (...)"*. Nonetheless, when asked to explain how the Magellan contributes to improving students' learning, what they apprehend the most refers to the influence of technology in students' motivation and increasing interest in activities involving these technologies. In this same field, some teachers say that this interest is transitory and will soon disappear or turn to other subjects, sites and environments that are not worked in classes. Regarding this topic, we highlight the following observation: *"(students) are not to be mistaken. At intervals they all play online games (...) to write at the laptop is no longer motivating. What motivate them there are the games, interactive games... because often educational games for them do not have interactive challenges. The games of Magellan are very didactic... games to learn multiplication tables, are no longer accepted. The discovery of Magellan is done. In the first year they are in the process of acquisition of skills but (when) they come to the fourth year (the last one) they already know it all"* (P3/E1). And, in other words, this observation appears in interviews with teachers of schools B and C, therefore it gives the impression of being an important topic that deserves to be more an object of reflexion. Teachers believe in the Magellan's power as far as students' motivation is concerned but they have reservations: the most acquainted students are with the Magellan, the less motivated they are to work with the laptop. This appears to be related with the innovative or non-innovative use of technology and deserves further discussion. As a matter of fact, teachers produce digital content for their classes, nearly always with PowerPoint and make it available to students by email or other technological supports. Only three teachers said that they guide and encourage students to develop activities with other languages such as the use of audio, video, imaging and movies to learn and display contents. They are also the same teachers who publish results of student work on blogs or websites of the group.

The teachers' speech also highlights the critical topics of the project related to: (i) the lack of technical support; (ii) the lack of continuing education; (iii) the suspension of the project; and (iv) the parents' attitude towards the acquisition of computers and their respective maintenance. It so happens that they actually tend to use the computer for personal purposes, inhibiting the teachers from working with students who do not take the computer to school. An important finding of this study is that the computers were introduced in school without a real raise of awareness of the actors for the aims and advantages of the Magellan project.

As teachers are concerned, they should receive training in the sense of being observers of the learning process, building computer literacy in their initial and continuous training, acquiring new skills as recommended in the ICT curriculum for teachers, to monitor students' strengths and to understand that besides technology, ICT has the potential to avoid situations like those we see today, criticized by specialists on this subject. *"In the long run people don't change, this means that the majority of teachers will do what they have done all along, which means using available textbooks or making handouts by cutting and pasting from other materials or now, making PowerPoints, often also by cutting and pasting only now it is electronic"* (Collis and Moonen, 2005:48).

The role of the teacher trained in ICT is to lead as an e-tutor and e-moderator. *"The teacher's role is to create the conditions for discovery rather than provide knowledge already established."* (Papert, 1996:75). In a constructivist perspective, ICT helps students *"here and now"* in the construction of their learning (Pedro & Moreira, 2003).

## CONCLUSIONS

This study showed that teachers are not familiar with the use of ICT in their classes in an innovative way. It was frequent to ear, during the interviews, that they ask students to do a copy in the computer, which corresponds to a very traditional paradigm. On the other hand, some teachers use ICT and the Magellan in a quite reliable way but they don't seem to be aware of their practice or they don't plan this utilisation of the learning facilities with ICT. Considering the two groups of teachers on whose responses this study is based, an important outcome is that the two groups, the ones from the interior and the ones from the costal regions, differ considerably not in their ICT practices, namely the use of the computer for texting and storytelling, but in how the use of the Magellan is regarded. Only 35% of the teachers from the interior of the country reported that they use the Magellan, in contrast with 87.5% of the teachers from schools in the coast. In this specific study and like in many other fields, these teachers from more urban regions are much more predisposed for this culture of new modes of learning and teaching.

Anyway it should be taken into account that teachers using the Magellan consistently constitute a small percentage. This utilization, leading the students to learning by discovery in an innovative way is the exception.

Moreover there are discrepancies between teachers' perspectives as to the use of ICT in learning and teaching tasks and activities and the conditions offered by the Government's policies concerning the inclusion of ICT in the Curricula. The critiques addressed by teachers to the Ministry are an example of this.

*"There are significant uncertainties surrounding their potential impact, especially for the new wave of programs that distribute laptops to students for school and home use on a large scale. The evidence so far is quite persuasive that programs that overlook teacher training and the development of software may yield low returns. Also, children may shift the time spent at home doing homework and studying to computer use that does little to boost educational achievement. [...] using increased access to computers—not necessarily on a one-to-one basis—to teach computer skills can produce large positive effects in these competencies, virtually erasing the related "digital divide" with a limited investment"* (Berlinski, 2011:169).

In Portugal, educational decisions makers should also be concerned with results like the ones presented in this study. In reality, added support and a more specialised training is needed towards a quick increase of learning and teaching quality in order to provide and enable much more student centred learning, where young people feel more concerned with new technologies used in an individualised, personalised and autonomous way, but also collaboratively as an alternative paradigm to thinking, discovering knowledge and learning creatively.

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