

# Fostering Inclusion in Portuguese Schools: Key Lessons from ICT Projects

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## ABSTRACT

This paper reports on different projects aimed at fostering inclusion in Portuguese elementary and high schools at national, regional and local level through ICT projects. Based on our participation in these projects, we describe the key lessons learned as regards using mobile technology, georeferenced information as well as children's and youngsters' interest and expertise in curricular activities. We argue that mobile technologies together with the creation and the publishing of multisensory georeferenced information can support educational engagement and inclusive participation in Portuguese school communities.

## Categories and Subject Descriptors

K.3.1. Computer Uses in Education. H.5.2 User Interfaces, K.4 Computers and Society

## General Terms

Design, Experimentation, Human Factors.

## Keywords

Schools, Portugal, informal learning, mobile, georeferenced.

## 1. INTRODUCTION

This paper presents the inclusion lessons learned from national, regional and local ICT projects for children and youngsters developed in Portuguese elementary and high schools. We reflect on the potentialities for inclusion afforded by allowing all school children and youngsters, including the demotivated and disengaged ones, to channel their everyday interests, sensory experiences and expertise into curricular activities, to build their own picture of the school communities and to make them visible by publishing georeferenced information.

Following Selwyn [16] [17], we consider two major approaches to technology, education and social inclusion/exclusion: 1) to use education to ensure social inclusion in terms of technology

opportunities; 2) to use technology to promote equal educational opportunities. The projects presented below include a national governmental project and one of its regional subprojects which adopted the first approach, a high school project which adopted the second approach, and a research project which integrated both approaches.

It is widely recognized that paying attention to the diversity of informal learning experienced in everyday activities can significantly contribute to addressing the inclusion/exclusion problem [3], [7], [16], [21]. The potentials of educational activities that allow kids and youngsters to make their voices heard by using their everyday culture and georeferencing their sensations and emotions have been illustrated by diverse research and educational projects, such as Social Tapestries [22], and Panwapa [12].

Depending on the context, different ways of contributing to learning inclusion and of bridging the digital divide have been explored. UNICEF, for example, has addressed the issue of information inclusion by using a wide range of resources, including mobile technologies, from laptops to cheap mobile phones and radios, and even paper [23]. In this article we recognize that "looking into pockets and handbags to see a small screen as a window to the world" [23] constitutes a major inclusion strategy in different continents such as Africa and Europe [23], [10], in different social contexts, such as urban and rural areas, as well as in different developmental stages, such as childhood and adolescence.

In this paper, we reflect on the potential for inclusion afforded by mobile technologies that allow children and youngsters to create and publish multisensory georeferenced information in a very heterogeneous country such as Portugal.

In the following section we provide a brief characterization of Portugal as well as the context of our work. We then present the set of ICT projects in which we participated (Internet@EB1, Património@Viseu, SchoolSenses@Internet, and Going Mobile) and describe the strengths and weaknesses of the strategies, digital technologies and other resources used in these projects to promote inclusion in Portuguese schools. Finally, we identify and summarize the lessons learned.

## 2. ICT IN PORTUGAL: A PORTRAIT

The Portuguese school system comprises nine years of basic education organized into three levels: the 1st level with four school years and the 2nd level with two school years correspond

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to primary education, while the 3rd level with three years corresponds to lower secondary education.

In basic education, failure and drop-out rates are considerable (see Table 1), despite significant efforts at local and national level to improve this situation.

**Table 1. Portuguese basic education failure and drop-out rate [11]**

Basic education level	1996/97	2006/07
1 <sup>st</sup>	11,3 %	3,9 %
2 <sup>nd</sup>	15,0 %	10,3 %
3 <sup>rd</sup>	20,4 %	18,4 %

ICT investment is part of the national effort to improve our educational outcomes. Thanks to the “e-escola” [5] and “e-escolinha” [6] initiatives all public schools now have a broadband connection and all students and teachers can buy a laptop computer with mobile broadband at a low price. “Magalhães” (literally, Magellan), a laptop for children based on the Intel Classmate PC [2], is available at subsidized prices for all children in primary education.

As a result of ICT investment in schools, the student/computer ratio has significantly decreased in the past few years (see Table 2).

**Table 2. Student/computer ratio in Portugal [11]**

Basic education level	Student/computer ratio		Student/computer with internet access ratio	
	2001/02	2006/07	2001/02	2006/07
1 <sup>st</sup>	26,7	15,1	52,3	22,4
2 <sup>nd</sup>	19,6	9	38,6	10,6
3 <sup>rd</sup>	17,6	8,9	36,1	10,6

Since young people’s digital practices are quite significant in their identity performance [4], when we foster inclusion in education we should consider students’ own technological devices. Mobile phones are widely used by young people in Portugal: 99% of teens from 16 to 18, 96.6% of teens from 13 to 15, and 84.2% of children from 9 to 12 own a mobile phone [1].

### 3. INTERNET@EB1: SCHOOL WEB PAGES AND A HANDBOOK JUST FOR KIDS

The Internet@EB1 project [9] was implemented from 2002 to 2005 and coordinated by the Foundation for National Scientific Computing. It was the first national project aimed at promoting the educational use of the Internet and was specifically targeted at all Portuguese public primary schools. As a result of this project, by 2005 the vast majority (around 90%) of public primary schools had already created their own web pages with the help and participation of pupils, while 65% of the 4th-year children had received a basic ICT skills diploma [14].

During the Internet@EB1 project and in order to support the development of basic ICT skills, a small handbook (pocket book) “just for kids” [18] was developed and distributed for free to all 4th-year public school children. This handbook facilitated the very first ICT learning experiences of some of the children and teachers living in Portugal’s inner land as well as of those who had had no previous direct contact with a computer. The story of a girl who received the handbook before having access to a computer is a good example of the importance of this educational tool. By the time the project staff arrived at her school and she could finally start using a laptop, she already knew how to write a text and how to save it in a folder with her name. This story illustrates the level of motivation displayed by numerous children from very small Portuguese villages without access to ICT in 2004.

According to staff testimonies, laptops and the handbook “just for children” were of fundamental importance in fostering ICT inclusion, since they allowed the project staff to offer children from the more isolated areas of Portugal their first experiences with ICT. The Internet@EB1 staff also witnessed that the creation of a web page by each school resulted in a stronger sense of belonging in children and teachers, since the children’s views of their school’s social, cultural and natural environment were essential for the production of such pages.

However, the primary schools’ web pages assessment included in the Internet@EB1 evaluation report listed the following inclusion problems [14]: the pages contained no references to other religions besides Catholicism; representations of ethnic diversity were seldom found; the great majority of the models and behaviors presented were representative of only the middle class; and the web pages analyzed contained some stereotypes, including gender stereotypes.

### 4. PATRIMONIO@VISEU: CHARACTERIZING AND GEOREFERENCING LOCAL HERITAGE

Património@Viseu [13] was a regional initiative of the Internet@EB1 project implemented in the Viseu district. Its main goal was to develop children’s sense of belonging to their communities and promote school-environment interaction by challenging primary schools to discover local heritage. The Património@Viseu web site gives access to the documents portraying children’s perspectives on local heritage.

During the Património@Viseu initiative, it was possible to observe that the more geographically isolated schools reacted more enthusiastically and creatively than the richer urban schools. The children and teachers from small rural schools actively looked for and proudly presented various examples of local heritage ranging from legends to endemic species.

The local heritage information was georeferenced by primary schools. With the help of their teachers, children represented the location of the heritage they had selected. Since Património@Viseu unfolded between 2003/2004, children used the geographic resources, such as maps and satellite photographs, which were available on the WWW at the time. In addition, they created their own resources (see Figure 1).

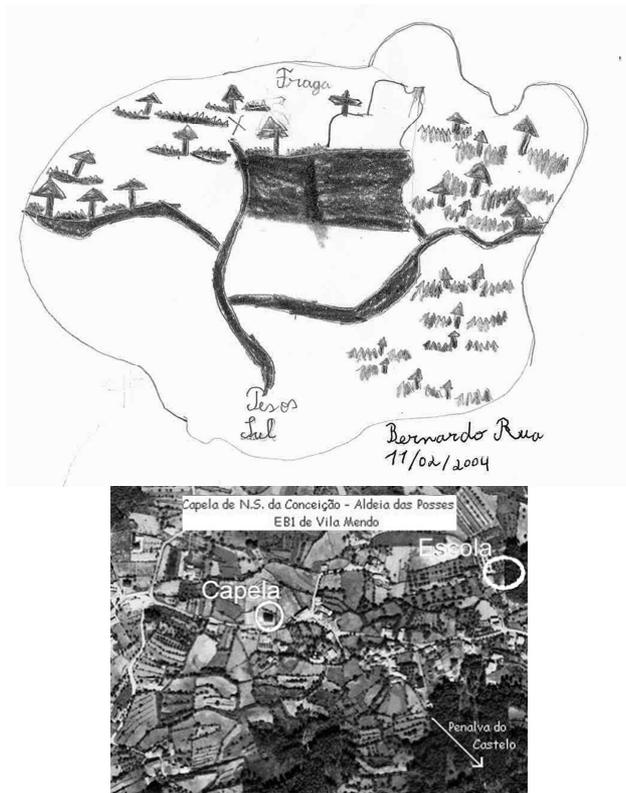


Figure 1. Examples of strategies used by schools to georeference local heritage. [13]

## 5. SCHOOLSENSES@INTERNET: CHILDREN AS CREATORS OF MULTISENSORY GEOREFERENCED INFORMATION

Following the conclusions of the Internet@EB1 project (described in the previous section) the SchoolSenses@Internet [15] research project was developed to explore the potential to be tapped by engaging primary school children in creating and sharing their visions of the world through georeferenced information. From 2007 to 2008, SchoolSenses@Internet project invited children to create and publish georeferenced messages with the purpose of making a sensory portrait of their schools. The children that participated in the project used GPS-enabled mobile phones to create georeferenced MMS messages and Google Earth [8] to visualize those messages in real time [19].

The creation of the schools' sensory portrait took place in three classes of two schools in two Portuguese cities: Viseu and Porto. Both boys and girls had no difficulties in using mobile phones and Google Earth to create and share their multisensory georeferenced messages, regardless of having had previous experiences with mobile phones or not. On the contrary, all children enthusiastically engaged in producing their creative sensory visions of their schools' positive and negative highlights [20].

This project gave voice to all the children in the schools, thus allowing them to produce multiple environmental views and

representations that enriched this participatory process of creating and sharing personal and communal geographies [20].

## 6. GOING MOBILE: PROMOTING INCLUSION WITH MOBILE PHONES

The Going Mobile project used technology to foster the inclusion of marginalized youth. The challenge to meet was an 8th grade class with very serious discipline problem and high dropout risk. The class was composed of fourteen students, nine boys and five girls aged from 15 to 17, who had accumulated several years of unsuccessful school experience. We used a "bottom-up" approach based on young people's digital practices and networked communication skills. Our strategy was to build on their enthusiasm in informal activities, using mobile phones affordance to cross boundaries. The activity proposed was a school coverage carried out with the students' mobile phones. After transferring all their recordings onto the classroom computer and using a multimedia projector to view them, students identified the exact location of each record on a school map and discussed possible solutions for the problems they identified.

It is not yet possible to claim that this approach significantly and consistently reduced disruptive behaviour and increased students' motivation in school. However, we can say that all the fourteen students actively and willingly engaged in the proposed activities and produced contents that reflected specific competences, such as the ability to identify and describe a situation, to express personal opinions, and to suggest realistic solutions to problems. This strategy may yield interesting results when applied to other curricular contents, as long as it is based upon students' interests, interaction skills, and digital practices.

## 7. LESSONS LEARNED

The assessment of these Portuguese projects allows us to state that challenging children and youngsters to participatory creation processes, using ICT like laptops and mobile phones, contributed to engaging students in learning activities, including the demotivated, the geographically isolated and ICT-marginalized ones.

The focus on georeferenced information was an important success factor for the participation of school learners from 8 to 17 years old. The creation of local multisensory information and its presentation in large-scale contexts contributed to making geographically isolated school communities more visible and to giving voice to de-motivated and undisciplined youngsters.

The above mentioned inclusion factors (everyday ICT resources, participatory activities and multisensory georeferenced information) were found to be equally engaging and successful for boys and girls.

The work described in this paper confirmed that while technology allows flexibility, personalization and individualization, there is a need for activities that acknowledge people's specific needs. In other words, the diversity of youngsters and their background needs to be acknowledged. Furthermore, if we want to encourage children and teenagers to express their own voice, we must be prepared to participate in unfamiliar and sometimes even uncomfortable ICT uses [16]. Otherwise, we will continue to marginalize youngsters and their everyday culture. To conclude, it is worth noting that resources that can always be present in

people's everyday lives, such as mobile phones and pocket books, together with sustainable activities, can be key factors for fostering inclusion.

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