



## Estudo sobre o uso de dispositivos móveis nas escolas: o caso de Portugal

### Study on the use of mobile devices in schools: the case of Portugal

Isabel Allen, Luísa Santos, Manuela Pinho, José Dias, Rui Ribeiro  
Agrupamento de Escolas da Maia – Portugal

#### Resumo

A pesquisa encontrada concentra-se em estudantes de educação básica e secundária das escolas, dentro dos campos linguagem, ciências sociais e exatas e, mais frequentemente, no contexto de assuntos específicos, como a matemática, português e estrangeiros, a história. Dois estudos exploram o uso de tecnologias móveis em atividades ao ar livre. Os dispositivos móveis geralmente são usados como uma ferramenta para estimular a motivação e fortalecer o engajamento, para o trabalho colaborativo e também para auxiliar no pensamento ou na reflexão construtiva.

*Palavras-chave:* mobile learning, revisão de literatura

#### Abstract

The research found focuses on students of basic and secondary education from schools, within the fields language, social and exact sciences and more frequently in the context of specific subjects, for example mathematics, portuguese and foreign languages, history. Two studies explore the use of mobile technologies on outdoor activities. Mobile devices are generally used as a tool to stimulate motivation and strengthen engagement, for collaborative work and also to assist with constructive thinking or reflection.

*Keywords:* mobile learning, research review

#### Introduction

For the Education sector, mobile connectivity provides an opportunity to offer new ways of teaching and learning that ultimately will improve performance and results. Mobile will increase access to up-to-date materials, will enable collaboration and strengthen learner engagement. Portugal education institutions are well equipped with ICT following a decade of policy support and investment by the Government. As a result, the use of e-Education and digital resources is well-established. The use of learning platforms is widespread, whilst most classrooms are equipped with interactive whiteboards and there are good ratios of desktop PCs to learners. The goal of 1:1 ratios for devices – mostly laptops, and sometimes games consoles or tablets – for students is becoming increasingly articulated. However, when this concept becomes linked with mobile devices, many remain wary of having phones in classrooms. Schools are frequently tied to existing systems making the leap to Mobile Education difficult. Suspicion of mobile phones in the classroom is still a major hurdle for many teachers, who have yet to move away from the view

that they are disruptive, towards seeing the potential for teaching and learning. A growing number of Mobile Education projects, trials and initiatives have highlighted the challenges of implementation and adoption. Most projects in schools are small scale and are led by an enthusiastic set of teachers backed by some research funding. The use of laptops, netbooks and tablets on a 1:1 basis is increasing and the benefits of Mobile Education are becoming clearer, but it is yet to be fully embraced. In Portugal there have been qualitative analyses of the use of mobile devices in education but there is a lack of statistical study.

The key objective of this report is to examine the current take-up and uses of Mobile Education technologies across non-higher education system in Portugal.

#### Portugal educational system (non-higher education)

The educational system in Portugal is divided into: preschool (for children between the ages of three to five and is not compulsory; compulsory schooling - basic education (9 years, in three stages) and secondary education (3 years); Post-compulsory schooling - higher education (university and polytechnic). In the academic year 2015-16, 1 663 479 students were enrolled in portuguese schools, 1 324 550 of which in public schools. The teaching staff in office, in the same year were 157 148, 26 697 of which in private schools. In Portugal, the process of integrating technological means for educational purposes was started in the 1980s. The first attempt to introduce ICT in education dates back to 1984 with the proposed CARMONA project created by the Dispatch no 68/SEAM/84. Created by Ministerial Dispatch no 206/ME/85, of October 31st the MINERVA project aimed to sensitize members of the educational community to the potential of technologies (Silva, 2007). The IVA project, developed between 1989 and 1992, was conceived to equip secondary schools, train teachers and teach students in IVA laboratories. FORJA project was part of FOCO (In-service Education for Teachers) and provided teacher training. The programme NÓNIO-SÉCULO XXI was created by ministerial dispatch on October 4th, 1996. It intended to carry out the new project in the scope of primary and secondary schools, with the support of institutions directed towards that purpose, namely the higher education institutions through the upgrading of acquired knowledge and

promoting its development with the demonstration effect with the communication tools and multimedia equipment and material. More recently, in the 21st century, the Technological Plan for Education<sup>4</sup> (PTE) emerged, which sought to modernize the technological infrastructures of Portuguese schools. There are still few cases of integration of mobile devices in education, although there are some pilot projects: Acer-European Schoolnet; Creative Classroom Lab; ManEEle; Edulab and Tek.Escolaglobal project. The topics related to the use of online technologies were integrated into the national curriculum in the 7th and 8th years of schooling, with a new discipline - ICT. Finally, the Ministry ends up presenting and putting in a public discussion a document entitled Profile of students leaving Mandatory Schooling. Of note is the mastery of digital literacies as transversal competences.

### Maia Cluster

Of 4 schools: Secondary School of Maia (host school), E.B. 2/3 of Gueifães; E.B1.n. ° 1 of Gueifães and E.B.1.n.° 2 of Gueifães. It is located in the urban area of the city of Maia, part of the municipality of the same name, one of the 16 that belong to the metropolitan area of Porto. Maia is a new city, with high level of prosperity but also with some surrounding areas still dedicated to agriculture. The level of unemployed parents has increased in the last couple of years due to the economic crisis. Nevertheless, we have a very residual level of dropout and students that are from a very poor background. In recent years we have seen that many new families have come to Maia to live as it is in the surrounding area of the main city of Porto. 760 children are enrolled in kindergarten and in the Elementary Schools, 1200 students are in grades from 5th to 9th, 1240 in Secondary school ( 1010 in secondary education and 230 in vocational education). As regards to the teaching staff, they are a total of 260: E.B1/n.°1 of Gueifães, 20 teachers, E.B1/n.°2 of Gueifães, 15 teachers, 80 teachers on 2/3 of E.B. Gueifães and 145 in the secondary school. As for the non-teaching staff, they make a total of 60 employees. The general objectives of the Educational Project for 2014/17 are: Improving educational attainment and the quality of learning; Educate for citizenship and promote health, sports and culture; Improve work efficiency and create a self-assessment culture; and deepen the relationship school / family / community. The main objective of our Cluster is to promote and implement an innovative and inclusive educational model. We want the target audience for this project to be not only the good and very good students, but also those to whom school is not a main concern. We want students who, by socio-economic and socio-cultural reasons, feel that this new school also thinks about them and invests on their success. Each classroom of the cluster of schools is equipped with a computer connected to the internet, a projector and, in the Elementary schools, an interactive whiteboard. All schools have a canteen, a library, a computer room, a gymnasium. As a result of the KA1 and the KA2 (Erasmus+ projects), the Cluster is starting to have contact with some innovative techniques in using mobile devices, apps and new approaches.

### Research in Portugal about the use of mobile technologies in school

We conducted a review of the master and doctoral studies available at <https://www.rcaap.pt/>, using the keywords m-learning or mlearning, and mobile learning, for Portuguese higher education institutions. From a total of 130 results, 20 studies were retrieved, with just one doctoral thesis. Inclusion criteria were: Master's and PhD theses; area of Educational Sciences; concerning primary and secondary education; in the context of 'classroom', that is, related to teacher / student interaction; teaching / learning of curricular contents. Those from other higher education levels, other research disciplines, adult education, outside of Portugal and about software development, without study in an educational context were excluded. We realized that although there have been qualitative analyses of the use of mobile devices in education there are not many systematic quantitative analyses of the effects of mobile-integrated education. The main objectives of the studies were:

- reflect on the specific ICT theme, in particular the impact of its use as a complement to face-to-face learning, the development and acquisition of transversal and specific competences;
- analyze the features that young people already use in their mobile phones and try to propose educational applications based on these uses;
- Understand how podcasts and mobile devices could be used to teach music in the 2nd Cycle;
- investigate whether the application of screencasts favours the learning and development of ICT skills; whether it helps motivate students, it allows the monetization of mobile devices, it helps in improving opinion about ICT discipline and what modality the students more adhere in terms of duration;
- analyze the potential of the podcast in a study visit to a museum, the advantages of using mobile devices in podcast listening, the impact of the podcast in supporting autonomous study, the contribution of the podcast to the promotion of active and meaningful learning and listening and the students' opinion regarding the motivation for discipline through podcasts;
- explore the latest technological innovations - Web 2.0, Web 2.0 Mobile, tools, services and applications - and audiovisual (audiobooks and cinematographic adaptations of literary works) to promote and disseminate literary reading in an educational context;
- observe and evaluate the impact of the use of students' mobile devices, as a tool to support learning, both from the perspective of students and teachers;
- the use of mobile applications for music education and lifelong learning through an online platform;
- to present the process of creation, implementation and evaluation of an Urban Game, MobiGeo, in order to provide a theoretical and practical contribution to overcome the insufficiency, reported in the literature, of a theoretical model aimed at studying Mobile Learning in informal learning environments.

Of the 21 studies analyzed, only one corresponds to a doctoral thesis. All other studies correspond to master's theses. The studies were carried out by students from the

following universities: U. Minho, U. Católica, U. Nova de Lisboa, U. Portucalence, U. Aveiro, UTAD, U. Porto, UAB e U. Coimbra.

The technology / tools used in the studies were: mobile phone, podcast, screencasts, interactive board, moodle, Android and others, iPads, iTunes, Apps, Future Classroom Lab, Edmodo, Web 2.0, mobile Web 2.0, tablet, smartphone, urban games, Qr Code sms and pedagogic game – Quizionarium.

The study was carried out with students from basic and secondary education, mostly from public schools, in the disciplines of English, Music Education, French Portuguese, ICT, Geography, Mathematics, History, Natural Sciences, etc.

The study methodology was mostly surveys and inquiry.

### Case Studies

One of the studies analysed how students appropriated mobile phones as a learning tool, assessed the mobile phone as a mediation tool in learning activities and discussed the potentials and limitations of their integration in teaching and learning process. The data analysis showed that despite the novelty of integrating mobile devices as tools to support learning activities, the students accepted to use their own mobile phones, which are naturally incorporated in their study practices, exploring several features on different curricular activities, both inside and outside the classroom, individually and collaboratively. This research was a contribution towards the integration of mobile devices into education and an alert about the new learning opportunities that are offered by mobile learning (Moura Adelina, 2010).

Another study focuses on the impact of the use of tablets in the teaching of history in the Secondary Education System. From the analysis of the tests and questionnaires and the observation that was conducted it was possible to conclude that the iTunes U platform allowed the organization of the learning process, promoting student autonomy and that the iPad allowed to annotate documents and create interactive works with the app Book Creator. Throughout the implementation of the study, it was found that this strategy provided another kind of dynamism and interactivity in History lessons, encouraged constructivist learning and the development of documentation analysis skills, in addition to increasing students' motivation to learn History. Participants acknowledged that they felt more motivated in History classes and that having tools like the iPad facilitate the learning process and contribute to the development of relevant skills, especially related to collaborative work and synthesis (Trindade Sara, 2014).

The third research aims to present the process of designing, implementing and evaluating an Urban Game, the MobiGeo, thus seeking to give a theoretical and practical contribution to bridging the failure, reported in the literature, of a theoretical model aimed to study the Mobile learning in informal learning environments. The "MobiGeo" was created in partnership with the Knowledge House of Vila Verde and the School EB 2,3 of Vila Verde, the theme was the "European Union" and

involved all classes of the 7th grade, in a total of 173 students. The results reveal that the MobiGeo is an Urban Game set for use in informal learning environments and students involved in the game showed high levels of motivation and interaction, which positively influenced their perceptions of learning. It was also found that the inclusion of Qr codes, even if an unknown application of most students, could encourage students to discover new content, enabling the fusion between real and virtual world. (Vieira Liliiana, 2014)

Another study was developed in order to verify the viability of using mobile devices as complementary didactic resources in the class. The inherent affinity young students have with these devices suggests they represent a potential improvement on the involvement of these student in the class and in the development of music dictation and musical reading (Carneiro Hermano, 2014).

The last study had as objective of research the evaluation of the presence and type of mobile devices between teachers and students, to potentially assess the of the possibility of their use in teaching student learning process. From the analysis of the data collected, it was found that the tablet is already used by a significant number of respondents outsider the school environment, while the smartphone has not yet been adopted by half of the referred population. Although the data collected shows the possibility of these devices to be used in the classroom environment, this potentiality is not yet explored (Carvalho Luis, 2015).

### Concluding remarks

The analysis of the studies, allow us to conclude that students love mobile technology and use it regularly in their personal lives for communication, information sharing, and predominantly for social interaction.

In relation to access to technology, middle and secondary-school students and their teachers have their own mobile devices.

In respect to the research on the use of mobile technology in education we find out that the use of mobile devices accelerated during the last decade and researchers mostly studied students of basic and secondary education from schools that are from the district of Lisbon, Porto and Braga.

Students want to use mobile devices in the classroom more often than they do now. They can conveniently use mobile devices without any problem as long as teachers can direct them for the correct used of the mobile devices. The possible constraints to effective usage of mobile device for instruction lies majorly with the teachers than with the students.

Researchers have used mobile devices as a tool to stimulate motivation and strengthen engagement, for collaborative work and also to assist with constructive thinking or reflection. Studies have also revealed that one of the largest obstacles to implementing effective mobile learning programs is insufficient preparation of the teachers.

It is possible to realize that there is paradigm change in teaching and learning process with the use of mobile devices. Therefore, there is a concerted need to explore

on the level of acceptance of mobile devices for re-defining education and to diagnose the potential and threats it might pose on the educational advancement of any nation.

There would be meaningful contribution to education if the mobile devices were well used as revealed in this studies.

All the studies carried out were based on case studies so for the moment what is lacking in Portugal is a statistical study on the use of mobile devices in education.

Erasmus+ Proj. 2016-1-RO01-KA201-024659  
BRINGING LIFE INTO THE CLASSROOM: inovative use of mobile devices in the educational process.

### References

#### Books and articles

- Balanskat, A. (2013) Avaliação do Projeto-Piloto de Tablets Acer-European Schoolnet. Ed. European Schoolnet.
- Carneiro Hermano (2014) A integração de recursos tecnológicos na disciplina de formação musical: uma nova abordagem às atividades de transcrição e de leitura melódica. Tese de Mestrado em Ensino da Música. Universidade Católica Portuguesa – Escola de Artes, Porto. 149 pp
- Carvalho Luis (2015) Utilização de dispositivos móveis na aprendizagem da Matemática no 3º Ciclo. Tese de Mestrado em Tecnologias de Informação e Comunicação na Educação. Universidade Portucalense – Departamento de Inovação, Ciência e Tecnologia, Porto. 153 pp
- Lagarto, J. R. & Marques, H. (2015). Tablets e Conteúdos digitais – Mudando paradigmas do ensinar e do aprender. Porto: Universidade Católica Editora
- Moura Adelina (2010) Apropriação do Telemóvel como Ferramenta de Apropriação do Telemóvel como Ferramenta de Mediação Mediação em Mobile Learning: Estudos de Caso em Contexto Educativo. Tese de Doutoramento em Ciências da Educação, na Especialidade de Tecnologia Educativa. Universidade do Minho – Instituto de Educação, Braga. 630 pp
- Trindade Sara (2014) O passado na ponta dos dedos: o mobile learning no ensino da História no 3º Ciclo do Ensino Básico e no Ensino Secundário. Tese de Doutoramento em Letras na Especialidade de Didática da História. Universidade de Coimbra, Coimbra. 435 pp
- Vieira Liliana (2014) Urban Games e códigos Qr na aprendizagem da Geografia: um estudo com alunos de 7º ano de escolaridade. Tese de Mestrado em Ciências da Educação na Área de especialização em Tecnologia Educativa. Universidade do Minho – Instituto de Educação, Braga. 181 pp
- West D., “Mobile learning: Transforming education, engaging Students, and improving outcomes,” Brooke Shearers Working Paper Series, Publication for the Centre for Technology Innovation at Brooking, pp. 3-18, 2013.

### Acknowledgements

We thank Ana Francisca Monteiro from University of Minho.