

Mobile learning: two experiments on teaching and learning with mobile phones

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1. Introduction

After affecting broadly the way people communicate and do business the Internet is now changing the way people learn. Major breakthroughs in information and communication technologies (ICT) have changed the preference of the younger generations as far as learning is concerned. In a society of knowledge, mobility and ubiquitous learning (learning anytime, anywhere), have been gaining relevance. From this point of view, the emerging paradigm of m-learning seems to fully meet the needs of contemporary society. When we talk about m-learning we think about the mobility of learners, “in the sense that learners should be able to engage in educational activities without the constraints of having to do so in a tightly delimited physical location” (Kukulska-Hulme, 2005).

This change in the pedagogical paradigm also demands transformation in the way the educational materials should be designed, developed and made available to anyone who wants to learn. It's within this context that the learning objects are influencing the next generation of educational designers, due to its potential of re-generation, adaptability and scaffolding (Urduan & Weggen, 2000; Gibbons et al., 2000). Taking these concepts into consideration, podcasts appear as a good example of objects or resources for learning.

It was in this context that we have developed the Mobile Generation¹ project supported by mobile devices with varying screen sizes. For this project we have created a Learning Environment Supported by Mobile Technologies (LESMT), called “Mobile Generation”. The aim of this project is to assess the implications of mobile technologies in individual and collaborative learning.

For an effective use of mobile technologies, we have produced a range of educational experiments using mobile devices such as mobile phones, MP3/MP4 players. The preference for these technological devices lays in the fact that they are in the students' hands and can, therefore, give a greater contribution to the education system. Among the experiments, we have highlighted the listening on curriculum contents, SMS text messaging and mobile quizzes, in java applications (midlets), such as vocabulary and Portuguese Literature tests/quizzes.

¹ <http://geramovel.wirenode.mobi/>

For an effective use of mobile technologies we have produced a range of activities based on the Portuguese syllabus. In this chapter we will mention two experiments: one, using Podcasts for the study of Portuguese Literature, and another one in Portuguese language learning focused on the use of mobile phones as a productive tool: text, audio, image, video and as an information repository. We will present students' perceptions about the use of mobile phones for learning purposes, both inside and outside of the classroom.

2. Mobile Learning: a new paradigm in education

The information age, characterized by the transformation of atoms into bits, by the technological convergence and, above all, by the computerisation of modern societies (Castells, 1996) is today in a new platform. We are in the age of the connection (Weinberger, 2003), with mobile technologies becoming increasingly ubiquitous and pervasive.

The mobile technology has caused radical differences in the way society works, learns and has fun. Mobile phones have become one of the fastest growth communication technologies (Campbell, 2006). Today the majority of them have the capacity of a PC of the nineties (Prensky, 2004).

The access to multimedia contents is no longer limited to a personal computer (PC). Now, it is also been extended to mobile technologies such as mobile phones, PDA, Pocket PC, Tablet PC or Netbook, providing a new educational paradigm. This new model is called mobile learning or learning through mobile devices. The mobile learning, an extension of e-learning, has developed for several years, resulting in several research projects (Moura & Carvalho, 2008; Sharples et al., 2007; Waycott, 2004).

Mobile phones are changing the possibilities and practicalities of many components of daily life, as well as transforming the nature of communication, affecting identities and the relationships. They have also had a deep impact on the development of social structures and economic activities, not to mention the influence they have in the perception users have about themselves and the world.

Mobile technology, especially mobile phones, is becoming an integral part of modern life around the world. Increasingly powerful, with more and more features and services, it is providing access to content anywhere, any time (Walker, 2007; Sharples et al., 2007; Prensky, 2004). For years, the number of mobile phones has surpassed the number of personal computers and is becoming the most acceptable system of interpersonal communication (Aretio, 2004). These capabilities make it an appropriate tool to be used in educational contexts.

The changes occurring in education are directly connected with those in technology, as said by Nelson (1999) "Rapid changes in communications and information technologies are revolutionising education and providing new tools to customise learning environments".

The development of m-learning as a new strategy for education has implications on the way students learn, on the role of the teachers as well as in the educational institution. This paradigm has led to the discussion about the way the process of learning is developed in a learning environment and supported by mobile technologies. In this context, students have more autonomy because they can learn whenever and wherever they want. Nevertheless, this model raises some questions that do not arise in the traditional pedagogical model and they lack research. In conclusion, we can say that mobile learning consists of a series of adaptations of technology for the pedagogical strategy of distance education. The changes

occurred in the way media is used for content transmission, the different formats that were acquired, based on new forms of communication among the ones intervening in the educational process, led to a change in the distance learning concept in recent years. Therefore, m-Learning is a natural evolution of technology's adaptations applied to the concept of d-Learning and e-Learning, as shown in Figure 1.

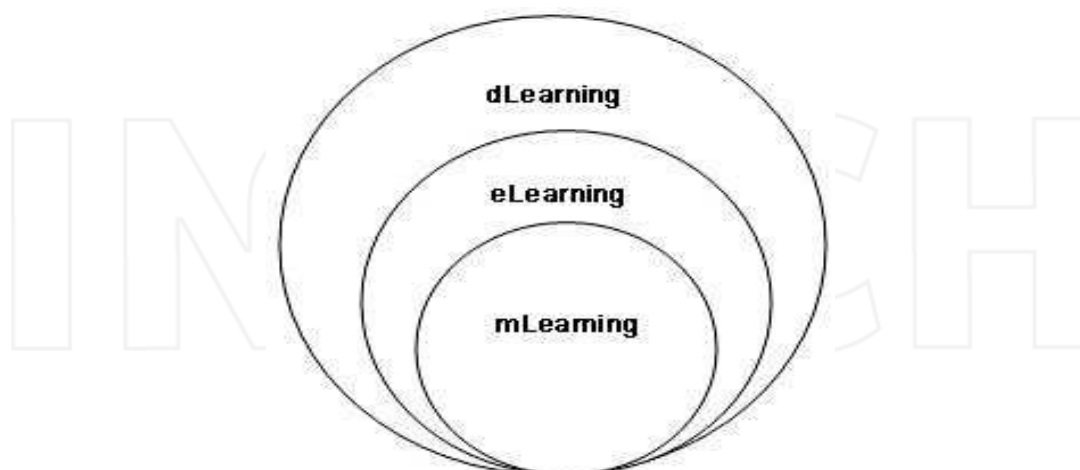


Fig. 1. The place of m-Learning as part of e-Learning and d-Learning (Georgiev et al., 2004)

2.1 Mobile phones in the educational context

Mobile phones seem to be, compared to all sorts of mobile devices, the most popular among younger people, probably the most widely owned handheld device (Trinder, 2005).

Though there are still some technical problems with regards to providing content such as graphics or complex Web pages, for highly interactive, future models will be more powerful and several current problems will be solved.

Thus, when creating mobile learning activities we must bear in mind all the limitations of equipment, in order to minimize the disadvantages. Therefore, units of content available only to learning just-in-time, practice and review of content, recordings, communication and access to information in the local set, sending reminders or relevant information for students, are good options (Thornton & Houser, 2002).

In future, teachers and students will no longer have to be restricted to a certain place and time to teach or learn. Mobile devices and wireless technologies will become, in the near future, an everyday part of learning both inside and outside the classroom.

2.2 Podcast: to learn anywhere, anytime

Since 2005, when Apple Computers incorporated the podcasts in its iTunes software, users can easily get an automatic update of recent podcasts (Chartrand & Pellowe, 2007). Moreover, the emergence of portals such as Podomatic or MyPodcast allow any user to write and publish their own podcasts for free. These circumstances provided a generalization of this technology, all over the world, and led us to create our podcasts as a complement for Portuguese Literature lessons, allowing students to access contents anywhere, anytime (Moura & Carvalho, 2006). Thus, the students have the Portuguese lectures available on audio files and they can easily download them, free of charge, to their

mobile devices (mobile phone, iPod, MP3 and MP4), and listen to them whenever and wherever they wish.

3. The thumb generation: implications for education

The expression "thumb generation" or "thumb tribes" was used by Howard Rheingold in his book "Smart Mobs", to name the younger generation, for its ability to write and send text messages using only its thumbs. Taro Matsumura (2004), in Log Keita, speaks about the origin of the expression "thumb tribe" and gives the following definition: "The young generation that utilizes the keitai functionalities of phone, e-mail and Internet frequently as part of daily life. The name stems from the quick motion of thumb pushing buttons on a cell phone". The young generation is sending more and more content and information by SMS, MMS and Bluetooth in an instantaneous way. With the Game Boy, the PSP and the mobile phones, this generation started to use the thumb rather more than the index finger, resulting in new behaviours, such as moving to tighten the bells with the thumb. In a study led by Sadie Plant (2001) from the Cybernetic Culture Research Unit at Warwick University, this author believes that the relationship between technology and users of technology is reciprocal, affecting each other:

"The fact that our thumbs operate differently from our fingers is one of the main things that defines us as humans. Discovering that the younger generation has taken to using thumbs in a completely different way and are instinctively using it where the rest of us use our index fingers is particularly interesting".

According to some researches, the youngsters' thumb is now more developed as a result of the deep impact new technologies have had in their daily routine. This generation prefers being at home running their fingers across the game console or the mobile phone keypad rather than play in the street (Hill, 2002). They are sending almost 240 messages per week and at the age of sixteen they own more than three mobile phones (Basto, 2008)

Hence, it becomes urgent to discuss the role of today's schools. They are now required to adjust their methods in order to meet the needs and expectations of a new generation, whose behaviour is undergoing significant changes as a result of the powerful influence television, mobile phones, Internet, YouTube and social networks (Facebook, Hi5, MySpace or Second Life) are having on the youths, as suggested by Fontana (2008): "Classrooms need to adapt to serve students who are plugged in online as never before, and corporations will need to adjust to the "thumb generation" and its thirst for connectivity and numerous computing devices".

4. Studies Description

Two studies were conducted in two classes - one of Portuguese Literature and the other one of Portuguese language - focusing on the use of mobile phones in learning. In order to carry out these studies, a variety of activities were developed. The main aims of these activities were to enable an effective use of mobile technologies within the curriculum and to give students the opportunity of learning at their own pace, time and location. The Mobile Generation² project (Figure 2) aims at using smartphone for individual and collaborative

² <http://geramovel.wirenode.mobi>

learning. Throughout all the process, we have tried to develop students' ability to create their own contents, build knowledge and respect for the learning speed of each student.



Fig. 2. Mobile Generation Website Project

These are some of the activities our students were asked to carry out using some of mobile phones features:

- Listen to Portuguese Literature podcasts;
- Competition for the best picture;
- Competition for the best idea in video;
- Voice recording in an oral presentation (rehearsals), recording of a few minutes of reading;
- Write a collective story or a poem in which several students contribute by SMS;
- Write a dictionary for vocabulary enrichment;
- 5 minutes of daily reading onto students' mobile phones.

4.1 First Study

4.1.1 Sample Characterization

This study targeted 15 students (only male) from a school group attending a Public Professional Course at Carlos Amarante Secondary School, in Braga - Portugal, 81% of which aged 16 or 17 and 19% aged 19. More than half of them (56%) came from a rural background, while 44% came from an urban.

Based on a questionnaire for data collection regarding the ownership of mobile devices, results show that all students have mobile phone, 67% of them have an MP3 player and only 27% have an MP4 player. The minimum required conditions for the development of curricular activities using mobile phones were, therefore, be assured.

4.1.2 Data collection instruments

Two questionnaires for data collection were developed, both were filled in at the end of the study. The first questionnaire, "The phone in educational context," aimed at assessing information about the number of students owning mobile phones and using these devices to send photos to Mobile Flickr. Our purpose was to analyse the implementation of the mobile phones in education. This questionnaire included open and closed questions (affirmative/negative) and we used a Likert scale, with 3 options: disagreement, uncertainty and agreement about the use of the mobile phones in school. With the second questionnaire, "Attitudes of pupils on the use of podcasts about the Baroque Style", we intended to obtain information about mobile devices owned by students (mobile phones, MP3 and MP4 players), places where they used them and how often they did it. It was also our aim to gather information on the general use of podcasts and on the perception students had about the use of this tool with regards to supporting the study of a Portuguese Literature.

This questionnaire was composed of three parts, which included open, multiple-choice and closed questions (affirmative/negative). For the students' perceptions about the use of Podcasts on the Baroque, we focused on the following dimensions: i) Pedagogical value of podcasts, ii) Clarity and organization of podcasts, iii) Use of the podcasts to learn, iv) Students' attitudes towards the podcasts, and v) Podcasts' usefulness. For this chapter we will refer only to the first two dimensions.

4.1.3 Data Analysis

The first data below focuses on the characterization of the students' use of mobile phones in an educational context. The other information is followed by the data collected in the second questionnaire, which focus on the attitudes of students towards the use of podcasts.

4.1.4 Ownership and uses of mobile phones

According to data collected in this inquiry, all the students own mobile phones, 87% of them have Internet connection, and only 20% of the devices are not Nokia's. As far as the mobile phone's use is concerned, when asked about the available services they used more often, the students gave the following answers: text messages, listen to music, voice calls (making or receiving), play games, using block-notes, schedule, take pictures, make videos, checking email, using the Messenger (MSN), GPS, Bluetooth, the converter and phone book.

However, among these the most used services are listed in table 1.

Itens	Use		Use more often	
	f	%	f	%
Text messages	3	20	12	80
Audio	6	40	9	60
Make and receive calls	10	67	5	33
Calendar	10	67	5	33
Video, pictures, MSN, Internet	11	73	4	27

Table 1. The most used mobile phones services (N=15)

It should be noted that the two most frequently used services are text messages and listening to audio files. This may be explained by the fact that these services meet the preferences of students and does not represent financial expenses, as most of the time the students have access to free SMS. When we asked them about what prevented the use of most services, they said to be the high costs.

We asked the students if their parents also imposed rules on the use of the mobile phone and only two students responded affirmatively, which shows that the young people in this age group already have a great autonomy and freedom. All students responded that the SMS' recipients were friends and 57% also mentioned the family. No student referred sending messages to teachers.

We also wanted to know how many times they send SMS on a daily basis. Thus, 47% said to send more than a hundred messages a day, 27% more than 20, 13% by 20 and 13% by 5 and 60% of students would like to be able to send messages from computer to the phone. With regards to accessing the MSN service from the mobile phone only one student disliked it. When asked about this preference students mentioned: "it's always useful" (02), "could speak as I wanted" (08), "I don't need to be connected to the computer" (05), "to be talking with friends "(09)," because one could always be online "(10)," because we can be anywhere and talk on MSN "(11).

Only two pupils don't have a mobile phone with a camera and 60% of them have not yet filmed a video. All students consider the phone as a complement tool in the classroom and argue that it "is a different way of learning" (02), "helps much in class" (15), "does not allow parallel conversations" (14), "helps to improve learning" (13), "it's innovative" (12), "through it I can have access to content for learning" (11), "I learn more" (10), "it gives us a lot of information" (09), "we can find a lot" (07), "I can perform work through the phone" (06), "it allows us greater autonomy" (05), "it allows us to keep content" (03), "it motivates more" (04).

All students stated that they like to be able to revise the curriculum content from the phone, except one, who considered that the mobile phone does not have enough performance. These results demonstrate the existence of a widespread possession of updated versions of mobile phones, with free Internet access, some capacity for video, audio and storage. These students seem to recognize positive attributes to these devices as an educational tool.

4.1.5 Using mobile phones in schools

Regarding the perception of students about the use of mobile phone at school (table 2), the majority of students (53%) considered that the mobile phones promote the right format for school, collaborative work (66%), motivation for the school activities (73%), quick access to content for learning (73%), be pleased about learning (60%) and the opportunity to access

the necessary information at any time and anywhere (73%). This data shows the agreement of students by using mobile phones in an educational context and a positive perception of the potential of this mobile device. These results also stress that the activities that students have made using the phones were well received.

Itens	Disagreement		Indecision		Agreement	
	f	%	f	%	f	%
To appreciate school	1	7	6	40	8	53
Collaborative work	1	7	4	27	10	66
Motivation for the school activities	0	0	4	27	11	73
Quick access to the learning content	0	0	4	27	11	73
Be pleased about learning	1	7	5	33	9	60
The opportunity to access the necessary information at any time and anywhere	0	0	4	27	11	73

Table 2. Using mobile phone in school (N=15)

4.1.6 Students' attitude and perception about the use of podcasts

Data presented below refers to the second questionnaire that inquired about students' attitude towards the use of podcasts on the study of Baroque style.

4.1.6.1 Possession, location and frequency of mobile devices use

Thus, in what concerns possession, location and frequency of mobile devices use, all students have a mobile phone, 87% of students have MP3 player and 27% MP4. The street has been referred as the place where most students use their MP3 and MP4, mobile phone is used by the majority of students (80%) both at home, in the street or in school. Asked about the frequency with which they use the devices, all students reported it to be daily, in the case of mobile phones, and 56% said to use two or three times a week for MP3 players.

All students mentioned having listened to the podcasts about the Baroque Style, 53% of the students heard them through the MP3 player and 47% through the mobile phone. For 80% of the students, podcasts were heard on the street and 67% reported having done other work while listening to them. When asked if listening to the podcasts helped them to better learn the contents, 93% responded affirmatively. All students found the podcasts a useful teaching resource and would like to continue to have the curricular content in this format.

4.1.6.2 Students' attitude towards podcasts

Regarding students' attitude towards the podcasts (table 3), only 20% of students considered not needing to attend Portuguese classes with podcasts, 33% of students believed that podcasts can replace the teacher and the majority (57%) of them undecided about whether or not they preferred to listen to the teacher explaining the subjects in class or to the podcasts. This may reflect the fact that students are more used to the traditional model than with technologies, a model that gives more autonomy to students to learn. When we asked if classes are more profitable with podcasts the majority of students (53%) agreed.

When we asked them whether the podcasts have no utility, 93% of the students disagreed which shows the acceptance of this learning tool. Only 20% of students agreed that they

preferred reading the contents than listening to them. This can be explained by the existence of different learning styles and because these students are the Net Generation born with the technologies and prefer sound stimuli.

Itens	Disagreement		Indecision		Agreement	
	f	%	f	%	f	%
With podcasts I do not need to attend Portuguese classes	5	33	7	47	3	20
The podcasts replace the teacher	6	40	4	27	5	33
With this podcasts classes are more profitable	1	7	6	40	8	53
The podcasts have no utility	14	93	1	7	0	0
I like to read the contents more than hear them in podcasts	6	40	6	40	3	20
I like more to hear teacher to explain the issues in class	0	0	8	57	7	43

Table 3. Students' attitude towards podcasts (N=15)

4.1.6.3 Podcasts' pedagogical value

As far as the podcasts' educational value dimension is concerned, (table 4) the majority of students (80%) believed that podcasts are a complement to the classroom, and with these podcasts students were more successful (53%), podcasts helped students prepare for the test (60%), memorize the contents (67%), stimulate students to learn (66%) and they helped students to review what they learn in class (80%). This data shows the positive perceptions that students have on the educational value of podcasts and the experience they lived during this experiment.

Itens	Disagreement		Indecision		Agreement	
	f	%	f	%	f	%
The podcasts are a supplement to the classroom	0	0	3	20	12	80
With these podcasts students get more success	1	7	6	40	8	53
The podcasts helped me to prepare for the test	0	0	6	40	9	60
The podcasts helped me to remember the contents	0	0	5	33	10	67
The podcasts encourage students to learn	1	7	4	27	10	66
The podcasts help me to review what we learned in class	0	0	3	20	12	80

Table 4. Podcasts' pedagogical value (N=15)

4.2 Second Study

4.2.1 Sample characterization

This study is being held with 18 students of grade 10 (only girls) in a Vocational School of Braga. They were 17 or 18 years old.

4.2.2 Data collection

For data collection one questionnaire was developed about the activities supported by mobile phones in the classroom as an educational tool and a complement of teaching and learning process. The questionnaire was filled in at the end of the study online in Survey Monkey.

4.2.3 Mobile phone used as a learning tool

The potentialities of mobile phones can be considered in three aspects: repository of information, productivity tool (audio, video and photo) and writing tool. We have presented to students some activities building on these three aspects.

To transform a mobile phone into a repository of information and to enrich vocabulary, we have proposed the creation of a dictionary in which each student will add the unknown words to their phones. In each class three or four difficult words and its synonyms were presented to students for writing on the mobile phone. The students could consult them whenever and wherever they wanted. We have encouraged students to use the mobile phone as a notebook to take notes, store concepts, definitions or relevant topics.

4.2.3.1 Mobile phone ownership, model and brand

Table 5 shows that all students have mobile phone and Nokia is the preferred brand (71%), going aligned with the world trends in this age.

Number of participants	Average age	Mobile phone ownership	Mobile phone model and brand
18	17,4	100%	Nokia - N73, 7610, Xpressmusic, 5000, 6111, 5200, 6630 (2), N81, N82, 2600, 6220 Sharp, Vodafone 527 Sony Ericsson Motorola BT50 Sagem Vodafone 226

Table 5. Sample mobile phone ownership, model and brand (N=18)

4.2.3.2 Students' age of getting the first mobile phone

Regarding the age at which students got the first mobile phone (table 6), we may realize that most of them (56%) said to have been between 9 and 11 years old and 44% between 12 and 13 years. A study conducted by the Personal Finance Education Group shows that the average age for the first mobile phone is 8 years of age in the UK.

Age	9	10	11	12	13
Percentage	16%	20%	22%	18%	24%

Table 6. Students' age of getting first mobile phone (N=18)

The reasons for having a mobile phone are mainly for mobile communication needs with friends (SMS), contact with family and listening to music.

4.2.3.3 SMS messaging

Table 7 presents the messages (SMS) sent weekly. We found that the most used number is 300 SMS or over messages per week (66.7%). All students said that they do not need to look at the mobile phone screen when writing SMS and they send SMS daily. This data is consistent with data previously mentioned.

Number of SMS text messages sent weekly	Students	Percentage
	f	(%)
0-99	0	0
100-199	2	11,1
200-299	4	22,2
300 or more	12	66,7

Table 7. Number of SMS text messages sent weekly (N=18)

4.2.3.4 Uses of mobile phones

Students use mobile phones to send and receive text messages, listen to music, take pictures, play games, write stories and to be in touch. They use mobile phones without restrictions and they use them in all possible locations, home, street, school and even in classroom if authorized.

Most students (83%) agreed with the permission of using mobile phone in the classroom. When asked to justify why the cell phone should be allowed in the classroom, the responses were equivalent to those presented in Table 10, with 61% considering it very useful to help in learning and 39% considering it favourable to distraction.

4.2.3.5 Mobile phone addiction

We asked students if the mobile phone is a worship object among youngsters and if they depend on it (table 8).

Itens	Disagreement		Indecision		Agreement	
	f	%	f	%	f	%
I have always my cell phone on	0	0	1	6	17	94
When cell phone rings I answer	4	22	6	33	8	45
I only answer important calls	11	61	2	11	5	28
I can not live without mobile phone	4	22	3	17	11	61

Table 8. Mobile Phone addiction

The majority of students (94%) is always connected to mobile phone, which means 24/7 (24 hours during 7 days) connectivity. The need to be in connection with their peers and family is one of the strongest motivations for student mobile phone use. Only 22% indicated not to answer whenever mobile phone rings, and 45% does. They felt unable to control their compulsion and felt distressed when they were unable to use it. For calls, only 28% said to answer important calls, 61% disagreed. Most students (61%) are unable to live without mobile phone. Walsh et al. (2007) found some mobile phone addiction between Australian youth, aged 15 to 24 years. For psychologists mobile phone addiction in teenagers may cause severe psychological disorders and represents a real problem for four in ten young adults in Spain. These are the conclusions reached by Francisca Lopez Torrecillas³.

4.2.3.6 Mobile phone use in Portuguese lessons

When asked why they like using the phone in the Portuguese class, they made the following statements (table 9):

I like the way we have used the mobile phone in Portuguese classes because ...	
- I have a faster access to the contents	- Facilitates the access to information
- I find interesting	- Learn a lot better
- I learn more	- Let me have notes in my cell phone
- Because it helps us to learn and motivates us	- Is useful to have the matter on the phone
- It make available a common dictionary	- Can have easy access to the demos in the classroom
- It help us	- We can do different things in relation to learning
- It facilitates writing a dictionary and it is very helpful to enrich my vocabulary	- I work better with it
	- I like to take notes and they are quick to access.

Table 9. Students opinions about using mobile phone in Portuguese class (N=18)

These statements show that the mobile phone receptivity into classroom is positive and the actions carried with it have interest and are helpful in learning (take notes, create a dictionary, quick access to specific information, writing stories, listen podcasts, etc.).

4.2.3.7 Advantage of using mobile phone in the classroom

On the edge of mobile phone as a tool for learning, (table 10) the majority of students (61%) considered it good for learning and 56% said mobile phone helps in learning. When inquired if the mobile phone is an element of distraction, the majority (61%) disagreed, only one student mentioned it is a cause of distraction and 33% indicated some indecision about it. It could be because cell phones are neither more nor less distractive that other non-digital tools.

³ <http://prensa.ugr.es/prensa/campus/prensa.php?nota=3624>

Itens	Disagreement		Indecision		Agreement	
	f	%	f	%	f	%
Using mobile phone in the classroom is good for learning	0	0	7	39	11	61
Mobile phone helps me in learning	0	0	8	44	10	56
Mobile phone is cause of distraction	11	61	6	33	1	6

Table 10. Advantage of using mobile phone in the classroom

These results provide some evidence on the relevance of using educational activities supported by mobile phone inside and outside the classroom. Ownership of mobile phones as an educational tool was not immediately accepted or recognized by some students. However, with the systematic use and awareness of its usefulness students will recognize it as a tool for learning.

School needs to take advantage of the mobile devices students have and make the best educational use of it.

5. Conclusion

Starting from the idea that education will change because computers can help teachers to teach better through the use of appropriate software (Bennett, 2001), it's urgent to continue to investigate the implications of mobile technologies in learning as a new model. The mobile technologies are tools, increasingly powerful and can help teachers create mixed educational opportunities (blended learning), extending the space of classroom, giving students more options about time and place to learn, helping to develop other kinds of methods and resources of information accessibility.

The mobile phone is popular among young people. All of our students own a mobile phone. This allows us to have the minimum conditions necessary for the completion of the experiments reported. The already widespread possession of mobile phone by students and brand preference for Nokia, show us the penetration of these devices and brand among young people. Despite the fact that students are still in the beginning of the use of mobile phones in educational contexts the data presented already shows positive perception about its utility and its value as a tool to support learning process. We highlight the fact that students use easily all services available in their mobile phone, especially the newer (Internet, MSN, GPS, e-mail).

The term "thumb generation" requires new thinking in educational settings and they are open to interaction, collaboration and learning in innovative ways. With our project, we explore the potential of mobile technologies, the skills of students, and create a learning environment capable of promoting the development of skills necessary for the demands of the working world of the twenty-first century. School needs urgently to prepare students for work in an increasingly competitive society and mobile technologies can help.

We intend to continue to investigate the potential of mobile technologies by conducting experiments to help understand some significant aspects of its application in educational contexts and to develop content for mobile phones with appropriate copyright software.

6. References

- Aretio, L. G. (2004). *Aprendizaje móvil, m-learning*. Retrieved 2th June, 2009, from <http://www.uned.es/catedraunesco-ead/editorial/p7-12-2004.pdf>.
- Basto, F. (2008). *Adolescentes enviam em média 236 sms por semana*. Retrieved 10th June, 2009, from http://jn.sapo.pt/paginainicial/interior.aspx?content_id=940316.
- Bennett, F. (2001). *Computers and K-12 Education: A Different View*. Retrieved 25th Mai, 2009, from http://technologysource.org/article/computers_and_k12_education/.
- Castells, M., Fernández-Ardèvol, M., Linchuan Qiu, J. Sey, A. (2007). *Comunicación móvil y sociedad, una perspectiva global*. Retrieved 25th Mai, 2009, from www.eumed.net/libros/2007c/312/.
- Chartrand, R. & Pellowe B. (2007). ELTPodcast.com - A Podcast and Website for Students and Teachers of English. In Thomas, M. (ed.), *Wireless Ready e-Proceedings - Podcasting Education and Mobile Assisted Language Learning*, 66 - 72.
- Gibbons, A. S., Nelson, J., & Richards, R. (2000). The nature and origin of instructional objects. In D. A. Wiley (Ed.), *The instructional use of learning objects*. Retrieved 5th June, 2009, from <http://reusability.org/read/chapters/gibbons.doc>.
- Georgiev, T., E. Gerogieva, A. Smrikarov (2004). *M-Learning - A New Stage of E-Learning*. Retrieved 6th June, 2009, from <http://ecet.ecs.ru.acad.bg/cst04/Docs/sIV/428.pdf>.
- Hill, A. (2002). Thumbs are the new fingers for the GameBoy generation. In *Guardian*. Retrieved 10th June, 2009, from <http://www.guardian.co.uk/uk/2002/mar/24/mobilephones.games>.
- Kukulka-Hulme, A. (2005). Introduction. In Kukulka-Hulme, A. & Traxler, J. (eds), *Mobile Learning: A Handbook for Educators and Trainers*. Routledge, London, 1-6.
- Moura, A. & Carvalho, A. (2008). Mobile learning with cell phones and mobile flickr: one experience in a secondary school. In Sánchez, Inmaculada Arnedillo (ed.), *IADIS International Conference Mobile Learning (mLearning) 2008*. Algarve, Portugal, 216-220.
- Moura, A. & Carvalho, A. (2006). Podcast: para uma aprendizagem Ubíqua no Ensino Secundário. In Alonso, L. P. et al (eds), Vol 2: *8th Internacional Symposium on Computer in Education*. Universidad de León, León, 379-386.
- Nelson, L., M. (1999). Collaborative problem solving. In C. M. Reigeluth (Ed.), *Instructional theories and models: A new paradigm of instructional theory* (2nd edition) Lawrence Erlbaum, Mahwah, NJ, 161-181.
- Plant, S. (2001). *On the mobile: the effects of mobile telephones on social and individual life*. Retrieved 20th Mai, 2009, from http://www.motorola.com/mot/doc/0/234_MotDoc.pdf.
- Prensky, M. (2004). What can you learn from a cell phone? almost anything!. *Journal of Online Education*. Retrieved 28th Mai, 2009, from <http://www.elearningsource.info/>.
- Prensky, M. (2001). *Digital Natives, Digital Immigrants, On The Horizon*. NCB University Press, vol. 9, nº. 5.
- Sharples, M., Taylor, J., Vavoula, G. (2007). *A Theory of Learning for the Mobile*. Retrieved 20th Mai, 2009, from <http://www.lsri.nottingham.ac.uk/msh/Papers/Theory%20of%20Mobile%20Learning.pdf>.
- Thornton, P., Houser, C. (2002). M-Learning: learning in Transit. In Lewis, Paul (Ed.). *The Changing Face of Call: A Japanese Perspective*. Taylor & Francis, 229-244.

- Trinder, J. (2005). Mobiles technologies and systems. In In Kukulska-Hulme, A. & Traxler, J. (eds), *Mobile Learning: A Handbook for Educators and Trainers*. Routledge, London, 8-24.
- Urdan, T. A. & Weggen, C. C. (2000). *Corporate e-learning: Exploring a new frontier*. Retrieved 26th Mai, 2009, from http://wrhambrecht.com/research/coverage/elearning/ir/ir_explore.pdf.
- Walker, K. (2007). Mapping the landscape of mobile learning. In *Kaleidoscope Report - Big Issues in Mobile Learning*. Retrieved 29th Mai, 2009, from http://www.lsri.nottingham.ac.uk/msh/Papers/BIG_ISSUES_REPORT_PUBLISHED.pdf/.
- Walsh, S., P. & White, K., M. & Young, R., M. (2007). Young and connected: Psychological influences of mobile phone use amongst Australian youth. In Goggin, Gerard and Hjorth, Larissa, Eds. *Proceedings Mobile Media 2007*, 125-134, University of Sydney.
- Waycott, J. (2004). *The appropriation of PDAs as learning and workplace tools: An activity theory perspective*. Unpublished PhD thesis, The Open University, United Kingdom.

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The education industry has obviously been influenced by the Internet revolution. Teaching and learning methods have changed significantly since the coming of the Web and it is very likely they will keep evolving many years to come thanks to it. A good example of this changing reality is the spectacular development of e-Learning. In a more particular way, the Web 2.0 has offered to the teaching industry a set of tools and practices that are modifying the learning systems and knowledge transmission methods. Teachers and students can use these tools in a variety of ways aimed to the general purpose of promoting collaborative work. The editor would like to thank the authors, who have committed so much effort to the publication of this work. She is sure that this volume will certainly be of great help for students, teachers and researchers. This was, at least, the main aim of the authors.

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