
Use of mobile phones by male and female Greek students

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Abstract: Mobile technology is a continuously growing domain, and research activities regarding its use are quite intensive. A questionnaire regarding the use of mobile devices was developed and distributed to 416 students in a Greek University. There were completed 384 questionnaires. The results revealed that students use their mobiles mostly for phone calls and Short Message Service (SMS). They also tend to use their mobiles to take photos and activate the reminder. However, they do not deal with many of the devices' operations. They use their mobiles to communicate (telephone, SMS and e-mail) mostly with their boy/girlfriend, then with their friends. They use their mobiles mostly at home, then at the university. Also, they consider health issues as the main reason to limit the use of their mobiles. Finally, there was not a statistically significant relationship between genders and their preferences.

Keywords: analysis of questionnaire; cell phone; gender difference; handheld device; higher education; mobile communications; mobile device; mobile phone; Personal Digital Assistant; PDA; smart phone; user experience.

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1 Introduction

Wireless communication technologies have become widespread all over the world. In 2006, 90.9% of the people in the developed countries and 32.4% of the people in the developing countries owned a cellular phone (ITU, 2006). Many people are mobile phone subscribers and own devices such as mobile telephones, digital cameras, personal digital assistants and laptops that are enabled with wireless fidelity (Wi-Fi) (Katz, 2005). One of the most important characteristics of laptop computers is wireless network access (Cutshall, Changchit and Elwood, 2006). Today, the most popular gadgets in addition to cell phones are iPods, tablet PCs and Personal Digital Assistants (PDAs) (Switzer and Csapo, 2005). Moreover, there has been a phenomenal growth in the number of devices that share the key characteristic of mobility and can process digital data and digital media (Anderson and Blackwood, 2004).

Handheld technologies are in a time of rapid change. In recent years, handheld devices have become one of the fastest growing communication technologies with subscriptions reaching over two billion worldwide (Wireless Intelligence, 2005). In 2006, there were 2,685 millions mobile cellular subscribers worldwide, and only 1,131 millions internet users (ITU, 2006). Results of a survey among university students revealed that respondents typically used their phones more than 10 hour per week, mainly for calling (Auter, 2007). Many users want to have all-in-one, so smart phones appeared. They constitute a hybrid of PDA and mobile phone supporting digital camera, calendar, note-taking, calculator, alarm and other functions (Mifsud, 2004). Smart phones are internet-enabled phones with many capabilities which also have the basic PDA applications included (Anderson and Blackwood, 2004). The super phone of today gives to someone all the features of a PDA with the addition of messaging and internet communications. A PDA can be used for a variety of functions; e.g. to manage work or make schedules, to record and store data and information (Waycott and Kukulska-Hulme, 2003; Scornavacca, Prasad and Lehmann, 2006). A PDA is generally viewed as a handheld device that provides electronic versions of the functions of a paper-based personal organiser. Such functions are often grouped together under the term Personal Information Manager (PIM). Modern PDAs are portable computing devices which include many of the features of a typical desktop PC with basic office applications (Anderson and Blackwood, 2004). Two important matters regarding handheld devices are wireless connectivity and data synchronisation (transfer to PDAs of the data stored in desktop and vice versa) (McDonough and Berge, 2006).

A person would always carry such a mobile device everywhere throughout his life (Sharples, 2000). A wide variety of devices such as cell phones, PDAs, laptops, but also devices like pen-scanners are used for mobile learning (Trifonova and Ronchetti, 2004, 2006; Trifonova, Georgieva and Ronchetti, 2006; Petrova, 2007; Vasiliou and Economides, 2007; Triantafillou, Georgiadou and Economides, 2008). According to Switzer and Csapo (2005), digital technologies should be utilised in the business education and curricula. The educational advantages of using handheld devices over full-size computers are attractive. Over the last decade the mobile phone has penetrated in every sector, presenting many opportunities to many areas, including higher education (Campbell, 2006). Handheld and mobile technologies have a lot to offer in compulsory education (Mifsud, 2004). According to Brown, Green and Harper (2002), several features contribute to the popularity of the mobile phone, but it is the 'mobile component' of the mobile devices which is the most important feature. On the other hand, Vahey and

Crawford (2002) questioned whether handheld technologies have impact on education and are different from all other technologies or not. Moreover, one can also say that there are obvious limitations in the use of mobile devices such as relatively small screen and limited computational power (Mifsud, 2004).

Mobile communication offers a lot of advantages but it has also negative aspects. In response to a question about mobile phone addiction, one out of three students said that they felt addicted to their phones. This sense of addiction may be related to dependency and heavy usage (Katz, 2005). The use of the internet in university education is at early stages and many problems still exist (Cheung and Huang, 2005). The use of new media increases students' interest in particular activities, but the devices are mainly used for communication via voice calls and text/picture messages (Trifonova, Georgieva and Ronchetti, 2006). Several studies in various countries (USA, Japan, Republic of Korea, Morocco, Norway, etc.) showed that mobile devices were widespread and they were used by nearly 100% of the young people (ITU/MIC, 2004). Short Message Service (SMS) was one of the most popular operations. PDAs and smart phones were considered more as business tools and were rarely owned by students (Attewell, 2004). Other studies showed that students were the top consumers of mobile phones and as a result the best audience for mobile applications (MobilEdia News, 2005). It is worth mentioning that students who used e-learning were much more positive to m-learning (Trifonova, Georgieva and Ronchetti, 2006). Of course, it is essential to take into account not only the changes of mobile use and communication, but also the effects of those changes for various social groups, organisations and individuals (Green, 2002; Lee and Whitley, 2002). Regarding the handset upgrades, previous usage habits may play a far more important role in post-upgrade usage behaviours than incremental technical capabilities (Sugai, 2007).

Most scholars agreed that the gender gap in the internet use had narrowed significantly in the college age group (Odell et al., 2000; Goodson, McCormick and Evans, 2001) as well as the general population (Brenner, 1997; Newburger, 1999; Jackson et al., 2001; Ono and Zovodny, 2003). In general, some of the differences between genders had vanished. However, some gender differences had been found in attitude towards technology, intensity of internet use, online applications preferred and experience in cyberspace.

Several studies reported that males had significantly more positive attitudes toward computers than females did (Collis and Williams, 1987; Makrakis and Sawada, 1996; Smith and Necessary, 1996). Also, technologies were not utilised in similar ways by men and women and as a result some differences still existed (Mitra et al., 2005). Another research among Chinese and British students found that men in both countries used e-mail and chat, played computer games and were confident about their computers skills more than their female counterparts (Li and Kirkup, 2007). It was suggested that women had to increase their level of involvement with computers, and both teachers and parents had to support them in this (Shashaani and Khalili, 2000). However, other studies contradicted these findings and reported that gender had no significant effect on any of the dimensions of computer attitude studied (Jennings and Onwuegbuzie, 2001; Shaw and Gant, 2002). Furthermore, one study reported that female college students possessed more positive attitudes than males (Zhang, 2002). Another research pointed out that males tended to try new things, while females preferred traditional ways.

However, girls tended to use more often media types that they deal with daily (Trifonova, Georgieva and Ronchetti, 2006). The unconformity in findings related to gender might be attributed to differences in methods or might show the greater adoption of technology by women (Mitra et al., 2005).

Gender difference was also found regarding the use of web applications. Male college students were more likely to use the internet for recreational purposes, information gathering and entertainment while females preferred to use the internet for communication (Shaw and Gant, 2002). Furthermore, females tended to be social as they used e-mail and instant messaging more than their male peers (Media Report to Women, 2000). Also, they stated that the e-mail messaging was the most important function of the internet (Wilson, 2000) and actually used the e-mail more than the males (Boneva, Kraut and Frohlich, 2001; Jackson et al., 2001). Another survey reported that females made more cell phone calls and sent more SMS messages than men did. Also, teenage girls used their devices more frequently so as to express their feelings while boys were more interested in the technical aspect (Doring, Hellwig and Klimsa, 2004). Saunders and Quirke (2002) stated that males expected the new technology to offer to them easy and quick answers and they worked alone or sometimes even in pairs. On the other hand, females were interested in the quality of the product and they preferred interactive group work. It is worth mentioning that females tended to study online more than men as online learning may be appropriate for women's lifestyles and they were also more likely to look for further views of education (Selwyn, 2006). Moreover, Selwyn (2006) reported that as the current situation changes, educational technology can be seen as a predominantly feminine activity. Generally, further research has to take place because gender differences emerge (Doring, Hellwig and Klimsa, 2004).

In this study, we tried to provide a better understanding of how mobile devices are used by students. A survey was conducted among Greek University students to explore these issues. According to the results, students tend to use their devices mostly for conversations and sending/receiving SMS. Moreover, they do not deal with many of the devices' services and characteristics. Generally, both genders do not use the internet and they do not send or receive e-mails via their mobiles. This might occur due to their current habits, lack of support and knowledge, high cost of the devices and of subscribing to mobile internet services, or some other reasons. Furthermore, participants mentioned the reasons about which they would limit the use of the mobiles. Concluding, there are some gender differences in the operation and use of the mobile devices but they are not significant.

The present study differs from previous studies in the following aspects:

- 1 Most previous studies examined the penetration rate, the reasons for owning (e.g. safety, fashion, social status, relationships, loneliness and freedom) and the effects (e.g. addiction, distraction, gratification and psychology) of mobile phones. We explicitly examined how university students actually use their mobiles.
- 2 There were not any previous studies on the use of mobile phones by the Greek students. We explicitly examined the use of mobiles by the Greek students.
- 3 There are few previous studies regarding gender differences in the use of mobile phones. Some of these studies found gender differences, while others did not find any gender differences. We found that there were not statistically significant differences among genders.

- 4 Previous studies investigated the use of mobile phones regarding only some popular functions (talking on the phone or sending/receiving SMS). We examined the comparative use of all functions of a mobile device (talking on the phone, sending/receiving SMS taking/sending/receiving/downloading photos/videos/songs/ring tones, reminder, web browsing, web search, etc.).
- 5 Previous studies investigated the use of mobile phones for communication with specific persons (friends or family). We examined the comparative use of mobiles for communication with various persons (boy/girlfriend, friends, family, colleagues, professors, etc.).
- 6 Previous studies investigated the use of mobile phones in specific places (e.g. school). We examined the comparative use of mobiles at various places (university, home, recreation places, transportation, walk, etc.).
- 7 In several previous studies, students were loaned mobile devices and had a specific period of time so as to learn how to use them and form an opinion about their operation.

However, students are much more interested in using their own devices rather than investing their time in learning how to use a new one (Trifonova, Georgieva and Ronchetti, 2006). We asked students about their own mobile devices. Since they use them daily, they are acquainted with most of their features and use those that they like.

2 Methodology

During 2006–2007, we reviewed previous studies not only on the use of mobile phones, but also on the use of computers and internet. We also reviewed previous studies on gender differences in using computers and internet. Most related previous studies investigated the penetration rate, the reasons and the effects of mobile phones in the general population. We were interested in revealing the explicit usage of mobile devices by the university students, and identifying if there are any gender differences. We determined appropriate items that would be included in our questionnaire. Then, we adapted and extended the items to include many cases. Besides questions on the demographics and on the use of the various electronic devices, there were three key themes in the questionnaire:

- 1 Use of mobile for specific functions.
- 2 Use of mobile for communication with specific persons.
- 3 Use of the mobile at specific places.

We also included an open question to the participants in order to express their opinion. In addition, we discussed these issues with colleagues. Then, four post-graduate students were asked to complete an initial questionnaire and make remarks. Some minor refinements were made in the questionnaire to incorporate their suggestions.

The questionnaire was distributed to 416 undergraduate students in an Economics Department at a Greek University. Most of the respondents were between the ages of 18 and 25. There completed 384 questionnaires. Female students accounted for 55% of the

respondents. All participants had 1 hour to fill out the questionnaire. Participation was voluntary and anonymous. They were given multiple-choice questions to answer and they had also to express or explain their opinion in an open question.

There were seven questions and each question contained many choices:

- *Question 1.* How many hours per day do you use the following electronic devices?
- *Question 2.* Every week via my mobile device, I do the following...
- *Question 3.* How many SMS do you send/receive to/from the following people..., every week via your mobile device?
- *Question 4.* How many e-mails do you send/receive to/from the following people..., every week via your mobile device?
- *Question 5.* How much time (minutes) per day do you use the mobile device for phone calls with the following people...?
- *Question 6.* How much time (minutes) during a day do you use your mobile device in the following places...?
- *Question 7.* Express your opinion about the most important reasons you would limit the use of your mobile device.

The first six questions are multiple-choice questions and the last one is an open question. In similar researches about the usage of mobile devices, there were some questions about the ways of phone and internet usage, availability of devices, sent and received SMS and e-mails, phone calls via the mobile phone, mobile phone use in different places and arguments against the daily usage of mobile phones and m-learning (Wei and Leung, 1999; Campbell, 2004, 2006; Liukkunen, Tolonen and Laru, 2005; Doring, Hellwig and Klimsa, 2005; Trifonova, Georgieva and Ronchetti, 2006). However, our questionnaire tries to identify the explicit use of the mobiles by the students. Although parts of these questions were also found in other studies, they were not so specific and thoroughly examined. Furthermore, a lot of research is still required as there is inconsistency in the findings and results of many previous surveys. Furthermore, this is a continuously changing environment where users are changing their habits and preferences and new technologies are emerging. Finally, in different countries and cultures users may have different habits and communication norms.

All the answers to the questionnaires were entered into excel sheets; male and female answers were classified separately. This was done in order to find gender differences that might emerge among students' answers. There were made tables with the percentages and the 'averages' of male and female population were found for every question, so that we could compare the answers of each group. By this way, there were obvious similarities and differences between the two group choices. The 'average' of each category is an approximation of the real average since we do not have answers for every possible case. For example, the 'average' for using Desktop PC in Table 1 is calculated as $0 \times 43.20 + 1 \times 20.12 + 2 \times 18.34 + 4 \times 12.43 + 7 \times 4.14 + 9.5 \times 1.78 + 10 \times 0.00 = 1.52$. Afterwards, the unpaired *t*-test was applied in order to statistically test the relationship between genders and their preferences, and determine if there was any significant difference between genders and their preferences. In all cases, the unpaired *t*-test indicated that there was not a significant relationship between genders and their preferences. Further discussion of the results takes place in the next section.

Table 1 Male population given in percentages using several electronic devices and 'averages' of time (hours) of every category

<i>Male</i>	<i>0</i> (hour)	<i>1</i> (hour)	<i>2</i> (hour)	<i>3–5</i> (hour)	<i>6–8</i> (hour)	<i>9–10</i> (hour)	<i>>10</i> (hour)	<i>'Averages'</i> (hour)
Desktop PC	43.20	20.12	18.34	12.43	4.14	1.78	0.00	1.52
Laptop PC	68.64	15.98	11.83	2.96	0.59	0.00	0.00	0.56
Mobile phone	2.96	46.15	23.08	13.61	4.14	1.78	8.28	2.75
Internet	40.83	24.26	14.79	10.65	5.92	0.00	3.55	2.03
Radio	17.75	22.49	26.04	23.67	5.33	2.37	2.37	2.53
TV, DVD and video	4.73	17.16	28.40	37.87	7.10	2.37	2.37	3.21
MP3 player, iPod, etc.	56.21	21.30	10.65	8.28	2.96	0.00	0.59	1.02
Digital photo camera	78.11	18.34	2.37	0.59	0.59	0.00	0.00	0.30
Video camera	92.31	7.10	0.59	0.00	0.00	0.00	0.00	0.08
Printer	78.70	18.34	1.18	1.18	0.00	0.00	0.59	0.31

3 Results and discussion

3.1 Electronic devices in everyday life

First, it was considered important to provide some general information so as to find out which electronic devices students are most likely to use. Tables 1 and 2 show how many hours per day students deal with several electronic devices. Both men and women mostly use their TV/DVD/video, mobile phones and radio. On 'average', both genders spend about 3.5 hour using their TV/DVD/video. They also spend more than 1 hour using their desktop PC and 1 hour using their laptop PC. Men spend about 2 hour on the internet, 3 hour using their mobile phones and 3 hour listening to radio. Women spend about 1 hour on the internet, 4 hour using their mobile phones and 4 hour listening to radio.

Table 2 Female population given in percentages using several electronic devices and 'averages' of time (hours) of every category

<i>Female</i>	<i>0</i> (hour)	<i>1</i> (hour)	<i>2</i> (hour)	<i>3–5</i> (hour)	<i>6–8</i> (hour)	<i>9–10</i> (hour)	<i>>10</i> (hour)	<i>'Averages'</i> (hour)
Desktop PC	60.00	20.47	11.63	5.58	0.93	0.93	0.47	0.86
Laptop PC	71.63	12.56	6.98	7.91	0.47	0.00	0.47	0.66
Mobile phone	3.72	26.05	19.53	24.65	9.30	5.58	11.16	3.93
Internet	50.70	26.98	9.30	8.37	2.79	0.93	0.93	1.17
Radio	6.05	15.35	20.93	31.63	16.28	3.26	6.51	3.94
TV, DVD and video	5.12	12.56	26.98	38.14	11.63	2.33	3.26	3.55
MP3 player, iPod, etc.	52.56	20.00	11.16	9.77	4.19	2.33	0.00	1.33
Digital photo camera	76.28	20.47	2.33	0.47	0.00	0.47	0.00	0.31
Video camera	86.98	11.16	1.40	0.00	0.00	0.47	0.00	0.18
Printer	73.49	23.72	2.33	0.47	0.00	0.00	0.00	0.30

The majority of both genders use 3–5 hour per day TV, DVD and video. Also, most females use 3–5 hour per day the radio, but most males use it 2 hour per day. Most students use 1 hour per day the mobile phone. As for the rest of the devices, students do not deal with them many hours. However, males tend to use the desktop PC and the internet more than women. According to other studies men used a lot and had more positive attitudes towards computers and internet than women (Collis and Williams, 1987; Makrakis and Sawada, 1996; Shashaani and Khalili, 2000).

3.2 *Weekly usage of auxiliary functions of the mobile devices*

Students use their mobiles mostly for communication via phone and SMS. In this subsection, we examine how they use the other features and operations of their mobiles (Tables 3 and 4). Excluding telephone calls and SMS communication, both genders use their mobiles mostly for taking photos and activating the reminder. On ‘average’, both genders take more photos than those sent and received. Also, they record more videos than sent and received. However, they record less sounds than sent and received. In addition, they prefer to create their own photos, video and sounds than to download others. During one week, both genders download about two photos and two songs, record three videos, send and receive two videos, receive two ringtones and surf and search the internet one time via their mobiles. However, men send and receive about four photos and three songs per week. Moreover, they take eight photos, download two videos and two ringtones, record three sounds, send three ringtones, activate seven reminders and make two conferences with other people. On the other hand, women send and receive five photos and five songs per week via their mobiles. Also, they take 11 photos, download 1 video and 1 ringtone, record 4 sounds, send 2 ringtones, activate 9 reminders and make 1 conference with other people per week.

Table 3 Actions performed by male population given in percentages via the mobile phone every week and ‘averages’ of every category

<i>Male</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>5</i>	<i>7</i>	<i>10</i>	<i>20</i>	<i>50</i>	<i>>100</i>	<i>‘Averages’</i>
Take photos	21.30	6.51	20.71	16.57	7.10	15.98	7.69	2.96	1.18	7.60
Send photos	47.34	10.06	15.98	5.92	7.10	8.28	4.14	0.59	0.59	3.76
Receive photos	44.38	9.47	13.02	11.83	7.10	7.69	5.33	1.18	0.00	3.87
Download photos	72.19	5.92	5.33	8.28	4.14	2.37	1.18	0.59	0.00	1.64
Record videos	37.28	17.75	18.93	7.69	9.47	4.73	4.14	0.00	0.00	2.91
Send videos	62.72	11.24	10.65	5.33	4.14	3.55	1.78	0.59	0.00	1.89
Receive videos	57.99	12.43	15.38	5.33	5.33	1.78	1.18	0.59	0.00	1.78
Download videos	74.56	7.10	4.73	5.33	2.96	3.55	1.18	0.59	0.00	1.53
Record sounds	45.56	13.02	14.20	10.06	8.88	5.33	2.37	0.59	0.00	2.84
Send songs	46.15	6.51	15.38	12.43	8.28	8.28	2.37	0.59	0.00	3.17
Receive songs	43.79	6.51	17.16	14.20	7.69	7.10	2.96	0.59	0.00	3.25
Download songs	71.01	4.14	8.28	5.92	5.33	3.55	1.18	0.00	0.59	2.06
Send ringtones	62.13	5.92	10.65	8.88	5.33	3.55	2.37	0.00	1.18	3.10

Table 3 Actions performed by male population given in percentages via the mobile phone every week and 'averages' of every category (continued)

<i>Male</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>5</i>	<i>7</i>	<i>10</i>	<i>20</i>	<i>50</i>	<i>>100</i>	<i>'Averages'</i>
Receive ringtones	62.72	6.51	13.02	4.73	5.33	4.73	1.78	1.18	0.00	2.36
Download ringtones	75.15	4.73	6.51	2.37	4.14	4.14	2.37	0.00	0.59	2.07
Activate reminders	27.22	10.65	15.38	17.16	10.06	10.06	5.92	2.37	1.18	6.53
Internet connection via my mobile phone	78.70	2.96	7.69	3.55	1.18	1.78	4.14	0.00	0.00	1.45
Search the internet via my mobile phone	79.88	3.55	7.10	2.96	1.18	2.37	2.37	0.59	0.00	1.41
Make conferences with more than one person	82.84	3.55	4.73	3.55	1.78	0.59	1.78	0.59	0.59	1.73

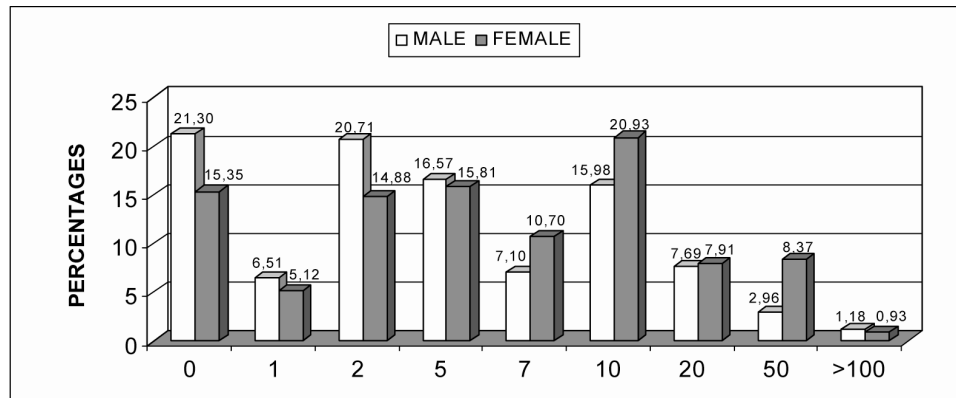
Table 4 Actions performed by female population given in percentages via the mobile phone every week and 'averages' of every category

<i>Female</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>5</i>	<i>7</i>	<i>10</i>	<i>20</i>	<i>50</i>	<i>>100</i>	<i>'Averages'</i>
Take photos	15.35	5.12	14.88	15.81	10.70	20.93	7.91	8.37	0.93	10.68
Send photos	40.00	9.77	20.00	9.30	4.19	7.91	6.05	2.33	0.47	4.88
Receive photos	38.14	9.77	18.14	10.70	6.98	8.84	4.65	2.33	0.47	4.93
Download photos	74.88	2.79	8.84	3.72	2.79	2.33	2.79	1.86	0.00	2.31
Record videos	31.63	20.93	21.40	11.63	4.19	6.51	2.79	0.93	0.00	3.19
Send videos	63.72	14.88	9.30	6.51	2.33	0.93	1.40	0.93	0.00	1.66
Receive videos	61.86	16.74	8.37	6.05	3.26	2.33	0.47	0.93	0.00	1.66
Download videos	78.60	6.51	6.51	3.72	0.93	1.86	0.93	0.93	0.00	1.28
Record sounds	31.63	18.14	19.07	13.02	5.58	7.44	3.72	1.40	0.00	3.79
Send songs	43.26	9.30	15.35	10.70	6.51	7.91	3.72	3.26	0.00	4.55
Receive songs	39.53	8.84	19.07	9.77	5.58	10.70	2.79	3.72	0.00	4.84
Download songs	73.02	5.12	8.84	5.58	3.26	2.33	0.47	0.93	0.47	1.99
Send ringtones	61.40	11.63	13.02	5.58	2.33	1.86	2.33	1.86	0.00	2.40
Receive ringtones	60.00	12.56	11.63	5.12	4.65	2.33	1.86	1.86	0.00	2.47
Download ringtones	77.21	4.65	6.98	2.79	3.72	2.79	1.40	0.47	0.00	1.38
Activate reminders	21.86	5.58	11.63	16.28	14.42	17.21	6.98	4.65	1.40	8.95
Internet connection through my mobile phone	86.05	3.26	4.65	1.86	0.93	2.79	0.47	0.00	0.00	0.66
Search the internet through my mobile phone	85.58	4.19	4.65	2.33	1.40	1.86	0.00	0.00	0.00	0.53
Make conferences with more than one person	87.44	3.26	3.72	2.33	1.40	1.40	0.47	0.00	0.00	0.55

Generally, it is noticed that on ‘average’ both groups do not send, receive or download many photos, songs, ring tones and sounds. Actually, in their majority, they might do not use these services at all. This might be attributed to the high cost of these services, as students tend to use mostly their mobiles for SMS or even phone calls. Although mobile operators in several countries tried to introduce simple pricing mechanisms, they have not decreased the connection prices (Sismanidis and Economides, 2007). It is costly to connect to the internet via mobile device in order to download songs, sounds, etc. Moreover, it is expensive to send and receive photos, songs, etc. According to Divitini, Haugalokken and Noverik (2002), students do not use all the possibilities of their mobiles because of the high costs of the operations. Another reason might be that students do not have the appropriate knowledge in order to deal with all the operations of a mobile device. Furthermore, many students do not own mobile devices with such services.

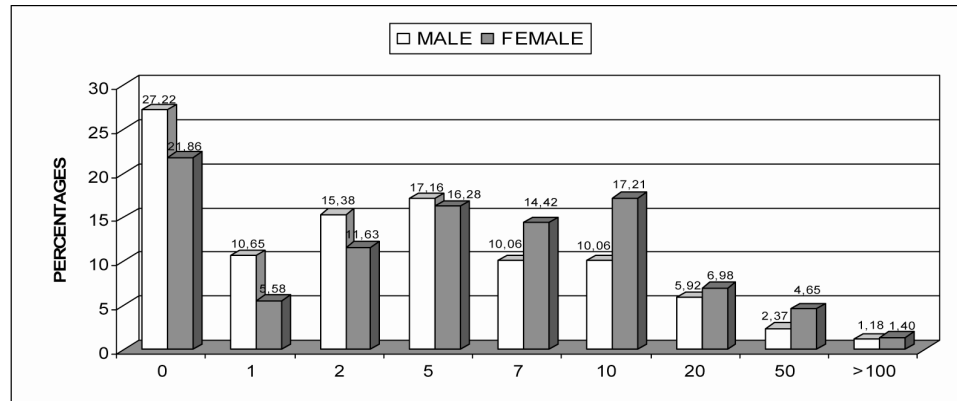
The majority of women (20.93%) take ten photos per week while most men (21.30%) do not take any photos (Figure 1).

Figure 1 Photos taken per week via the mobile phone



Generally, it is noticed that both groups do not deal with a lot of operations and features and they use the mobile devices mostly for simple reasons. According to Trifonova, Georgieva and Ronchetti (2006), almost everybody used the mobile devices for conversations and SMS. Moreover, it could be claimed that most participants do not deal with operations related to the internet because of the high cost or even the lack of experience.

The majority of men (27.22%) and women (21.86%) do not activate any reminders per week (Figure 2). Nevertheless, the participants of each group are allotted as, for instance, 17.21% of women activates ten reminders while 17.16% of men activates five reminders.

Figure 2 Reminders activated per week via the mobile phone

Finally, the smashing majority of both groups do not connect to the internet via their mobiles. Students may use a PC or a laptop so as to connect to the internet but most of them do not use their mobile devices to do it. This may happen because they do not own mobiles with such services or due to the high cost of operations related to the internet. It is claimed that men tend to use more internet than women, but they do not use it via their mobiles. It was reported in another study that only a small number of respondents accessed the internet via their mobiles while almost all accessed it via other ways (Trifonova, Georgieva and Ronchetti, 2006). Students have to learn how to use all services and they have to be better-informed in the future. According to many studies, the use of the internet in university education is still in its early stages and many issues regarding its use have not been addressed (Cheung and Huang, 2005). Generally, students need to use the internet for educational purposes and in their daily life, too. Universities and schools should become leaders in teaching students the ways to use technology so as to support them in dealing with it in every sector successfully.

3.3 Weekly usage of SMS messages and e-mails

In this subsection, it is examined the number of SMS and e-mails sent and received by males (Tables 5 and 6) and females (Tables 7 and 8) via their mobiles every week. There is a balance on the number of messages sent to and received from the same person. For example, they send to and receive the same number of messages from their boy/girlfriend. So, there is mutuality in their relationships regarding message exchange. Both genders send most of their SMS to boy/girlfriend and the least SMS to their professors. On 'average', men send and receive 23 SMS per week from girlfriends and 2 from professors, whereas women send and receive 26 SMS per week from boyfriends and 1 from professors.

Table 5 Male population given in percentages sending a total number of SMS every week via the mobile phone and averages of every category

<i>Male</i>	0 (SMS)	1 (SMS)	2-5 (SMS)	6-10 (SMS)	11-50 (SMS)	51-100 (SMS)	>100 (SMS)	'Averages'
Your boy/girlfriend	16.57	4.14	14.79	20.71	30.18	9.47	4.14	22.71
Your friends	6.51	6.51	23.08	33.14	24.26	5.92	0.59	15.98
Your family	46.75	11.24	23.08	11.24	7.10	0.59	0.00	4.43
Your colleagues	14.79	7.10	30.77	24.85	17.75	4.73	0.00	12.12
Your professors	88.17	2.96	3.55	3.55	0.00	1.78	0.00	1.78
Others	49.70	11.24	24.85	7.10	6.51	0.59	0.00	3.98

Table 6 Male population given in percentages receiving a total number of SMS every week via the mobile phone and 'averages' of every category

<i>Male</i>	0 (SMS)	1 (SMS)	2-5 (SMS)	6-10 (SMS)	11-50 (SMS)	51-100 (SMS)	>100 (SMS)	'Averages'
Your boy/girlfriend	15.38	4.14	14.79	20.71	29.59	10.06	5.33	23.16
Your friends	7.10	4.73	20.71	33.14	26.63	6.51	1.18	17.64
Your family	49.11	11.24	18.93	11.83	6.51	1.78	0.59	5.64
Your colleagues	13.02	7.10	30.18	28.99	16.57	3.55	0.59	11.77
Your professors	85.80	5.92	4.14	1.18	2.37	0.59	0.00	1.67
Others	50.30	8.28	26.63	8.28	3.55	2.37	0.59	5.14

Table 7 Female population given in percentages sending a total number of SMS every week via the mobile phone and 'averages' of every category

<i>Female</i>	0 (SMS)	1 (SMS)	2-5 (SMS)	6-10 (SMS)	11-50 (SMS)	51-100 (SMS)	>100 (SMS)	'Averages'
Your boy/girlfriend	19.53	1.86	13.02	15.81	32.56	10.23	6.98	26.37
Your friends	6.98	1.86	15.35	27.91	32.56	12.56	2.79	24.99
Your family	34.88	12.09	28.37	16.74	5.58	1.40	0.93	6.14
Your colleagues	12.56	6.98	20.47	33.02	21.40	3.72	1.86	14.62
Your professors	89.30	3.72	4.19	1.40	1.40	0.00	0.00	0.72
Others	52.56	9.30	18.14	14.42	5.12	0.47	0.00	3.79

Table 8 Female population given in percentages receiving a total number of SMS every week via the mobile phone and 'averages' of every category

<i>Female</i>	0 (SMS)	1 (SMS)	2-5 (SMS)	6-10 (SMS)	11-50 (SMS)	51-100 (SMS)	>100 (SMS)	'Averages'
Your boy/girlfriend	19.53	2.33	13.02	14.42	30.23	13.49	6.98	26.49
Your friends	10.23	1.40	13.49	28.37	30.70	12.56	3.26	24.86
Your family	37.67	11.63	27.91	15.81	5.12	1.40	0.47	5.44
Your colleagues	19.07	4.19	20.00	29.30	21.86	3.26	2.33	14.54
Your professors	89.77	4.19	3.72	1.40	0.93	0.00	0.00	0.57
Others	54.42	7.44	20.00	13.49	4.19	0.47	0.00	3.48

Particularly, over 30% of women send 11–50 messages to their boyfriends and friends, and receive the same number from them. Similarly, 30% of men send 11–50 SMS to their girlfriends and receive the same number. However, about 30% of men send and receive 6–10 SMS from their friends. Also, about 30% of females and males send and receive 6–10 messages from their colleagues. The majority of them does not send or receive any SMS from their family, professors and others. Women appear to send and receive more SMS than men.

Most students do not use their mobiles to send and receive e-mails (Tables 9–12).

Table 9 Male population given in percentages sending a total number of e-mails every week via the mobile phone and ‘averages’ of every category

<i>Male</i>	<i>0</i> <i>(e-mail)</i>	<i>1</i> <i>(e-mail)</i>	<i>2</i> <i>(e-mail)</i>	<i>3</i> <i>(e-mail)</i>	<i>5</i> <i>(e-mail)</i>	<i>10</i> <i>(e-mail)</i>	<i>>10</i> <i>(e-mail)</i>	<i>‘Averages’</i>
Your boy/girlfriend	88.76	1.78	2.96	2.37	0.59	1.18	2.37	0.53
Your friends	88.17	2.37	2.37	2.96	2.37	0.00	1.78	0.46
Your family	91.72	2.37	0.00	2.96	0.59	1.18	1.18	0.38
Your colleagues	88.76	2.96	2.96	2.96	0.59	0.59	1.18	0.38
Your professors	93.49	2.96	1.18	1.18	0.59	0.59	0.00	0.18
Others	93.49	1.18	1.78	0.59	1.78	0.59	0.59	0.27

Table 10 Male population given in percentages receiving a total number of e-mails every week via the mobile phone and ‘averages’ of every category

<i>Male</i>	<i>0</i> <i>(e-mail)</i>	<i>1</i> <i>(e-mail)</i>	<i>2</i> <i>(e-mail)</i>	<i>3</i> <i>(e-mail)</i>	<i>5</i> <i>(e-mail)</i>	<i>10</i> <i>(e-mail)</i>	<i>>10</i> <i>(e-mail)</i>	<i>‘Averages’</i>
Your boy/girlfriend	89.35	0.59	3.55	2.96	1.18	0.59	1.78	0.46
Your friends	88.76	1.78	5.33	1.78	1.78	0.00	0.59	0.33
Your family	90.53	2.37	1.78	2.96	2.37	0.00	0.00	0.27
Your colleagues	89.35	1.18	3.55	0.59	4.73	0.59	0.00	0.40
Your professors	94.08	2.37	1.18	1.78	0.59	0.00	0.00	0.13
Others	92.90	2.37	2.37	0.00	1.78	0.00	0.59	0.22

Table 11 Female population given in percentages sending a total number of e-mails every week via the mobile phone and ‘averages’ of every category

<i>Female</i>	<i>0</i> <i>(e-mail)</i>	<i>1</i> <i>(e-mail)</i>	<i>2</i> <i>(e-mail)</i>	<i>3</i> <i>(e-mail)</i>	<i>5</i> <i>(e-mail)</i>	<i>10</i> <i>(e-mail)</i>	<i>>10</i> <i>(e-mail)</i>	<i>‘Averages’</i>
Your boy/girlfriend	93.02	1.86	1.40	2.33	1.40	0.00	0.00	0.19
Your friends	92.56	2.33	1.86	0.93	2.33	0.00	0.00	0.20
Your family	95.81	0.93	0.93	0.93	0.93	0.00	0.47	0.15
Your colleagues	93.49	1.86	1.86	1.40	1.40	0.00	0.00	0.17
Your professors	95.81	0.93	0.93	1.40	0.93	0.00	0.00	0.12
Others	96.28	0.93	0.93	0.93	0.93	0.00	0.00	0.10

Table 12 Female population given in percentages receiving a total number of e-mails every week via the mobile phone and 'averages' of every category

<i>Female</i>	0 (e-mail)	1 (e-mail)	2 (e-mail)	3 (e-mail)	5 (e-mail)	10 (e-mail)	>10 (e-mail)	'Averages'
Your boy/girlfriend	93.95	1.40	0.93	2.79	0.93	0.00	0.00	0.16
Your friends	95.35	0.47	0.93	1.40	1.86	0.00	0.00	0.16
Your family	97.21	0.93	0.00	0.93	0.47	0.47	0.00	0.11
Your colleagues	94.88	1.40	1.86	1.40	0.47	0.00	0.00	0.12
Your professors	97.21	1.40	0.47	0.47	0.47	0.00	0.00	0.06
Others	97.67	0.93	0.47	0.47	0.47	0.00	0.00	0.06

3.4 Mobile phone calls in everyday life and mobile use in several places

Next, it is examined how much time men and women talk on phone with various persons every day (Tables 13 and 14). On 'average', both genders spend most time speaking with their boy/girlfriend and their least time speaking with their professors. Specifically, men speak about 11 min per day with their girlfriend and 7 min with their friends. On the other hand, women speak 15 min with their boyfriend and 10 min with their friends.

Table 13 Male population given in percentages talking on mobile phones (min) with various persons every day and 'averages' of time (min) of every category

<i>Male</i>	0 (min)	1 (min)	2-5 (min)	6-10 (min)	11-30 (min)	31-60 (min)	>60 (min)	'Averages'
Your boy/girlfriend	14.20	13.02	24.26	21.30	18.34	5.92	2.96	10.91
Your friends	4.14	20.12	30.18	30.77	13.02	1.78	0.00	7.20
Your family	11.83	23.67	28.40	25.44	9.47	0.59	0.59	5.83
Your colleagues	14.20	28.99	26.63	19.53	10.65	0.00	0.00	4.97
Your professors	83.43	7.10	5.33	1.18	2.37	0.59	0.00	1.11
Others	56.21	15.38	18.34	4.73	4.14	0.59	0.59	2.65

Table 14 Female population given in percentages talking on mobile phones (min) with various persons every day and 'averages' of time (min) of every category

<i>Female</i>	0 (min)	1 (min)	2-5 (min)	6-10 (min)	11-30 (min)	31-60 (min)	>60 (min)	'Averages'
Your boy/girlfriend	20.47	7.44	16.28	14.88	23.72	11.16	6.05	15.40
Your friends	7.91	16.28	23.26	27.44	19.07	5.58	0.47	9.90
Your family	12.56	18.60	21.86	26.51	16.28	2.33	1.86	8.58
Your colleagues	18.14	19.53	26.98	23.72	10.70	0.93	0.00	5.65
Your professors	89.30	4.19	3.72	1.40	1.40	0.00	0.00	0.57
Others	57.67	13.02	15.35	10.23	3.26	0.47	0.00	2.37

Particularly, most females talk 11–30 min with their boyfriend, 6–10 min with friends and family, 2–5 min with colleagues and 0 min with professors and others. On the other hand, the majority of men talks 6–10 min with friends, 2–5 min with family and girlfriend, 1 min with colleagues and 0 min with professors and others. It can be noticed that women tend to talk more on phone than males.

Next, it is examined how much time men and women use their mobiles at various places everyday (Tables 15 and 16).

Table 15 Male population given in percentages using the mobile phone every day (min) in various places and ‘averages’ of time (min) of every category

<i>Male</i>	0 (min)	1 (min)	2–5 (min)	6–10 (min)	11–30 (min)	31–60 (min)	>60 (min)	‘Averages’
In university	5.92	17.75	33.73	25.44	7.69	4.14	5.33	10.05
In work environment	36.69	17.16	16.57	17.16	5.92	1.78	4.73	6.99
At home	6.51	13.61	25.44	23.08	20.12	5.33	5.92	12.97
In recreation places (e.g. café, cinema, bars, etc.)	11.83	15.38	26.63	31.36	11.24	1.18	2.37	7.86
In public transportation (e.g. bus, train and taxi)	23.67	26.63	27.81	13.02	5.92	0.59	2.37	5.18
When you walk	18.93	23.67	26.63	21.89	4.14	1.78	2.96	6.35
When you shop	43.20	24.85	18.93	5.92	4.14	1.18	1.78	3.84
When you exercise (e.g. gym)	67.46	14.20	6.51	8.88	0.00	0.00	2.96	2.86
When you drive car or ride bike	43.79	18.93	18.93	10.06	4.14	1.78	2.37	4.73
In other places	48.52	13.02	21.89	8.28	2.37	2.37	3.55	5.25

Table 16 Female population given in percentages using the mobile phone every day (min) in various places and ‘averages’ of time (min) of every category

<i>Female</i>	0 (min)	1 (min)	2–5 (min)	6–10 (min)	11–30 (min)	31–60 (min)	>60 (min)	‘Averages’
In university	7.91	9.30	31.63	23.72	18.14	6.98	2.33	11.39
In work environment	46.05	10.23	15.35	12.09	9.30	4.19	2.79	7.09
At home	7.44	6.05	13.49	21.86	24.19	16.74	10.23	21.00
In recreation places (e.g. café, cinema, bars, etc.)	10.70	14.42	21.86	30.70	13.95	6.51	1.86	10.30
In public transportation (e.g. bus, train and taxi)	13.02	21.86	27.91	22.79	7.91	4.19	2.33	7.94
When you walk	16.28	21.86	25.58	21.40	12.09	1.86	0.93	6.71
When you shop	34.42	23.72	20.93	14.42	4.19	0.93	1.40	4.24
When you exercise (e.g. gym)	75.35	11.16	8.37	3.26	0.93	0.47	0.47	1.35
When you drive car or ride bike	71.63	13.95	7.44	5.12	0.93	0.00	0.93	1.56
In other places	63.26	8.84	14.88	7.91	3.26	0.47	1.40	2.96

On ‘average’, men use their mobile at home for 13 min and at the university for 10 min. However, women use it for about 21 min when they are at home, 11 min at the university and 10 min at recreation places.

Specifically, most women and men use their mobiles 2–5 min per day at the university, transportation services, places of entertainment, and when they walk. However, most of them do not use their mobile at work, gym, other places and when they drive or go for shopping. However, most women use the devices for 11–30 minutes per day at home whereas men use them for 2–5 min.

3.5 *Worries regarding the usage of the mobile devices*

The last question in the questionnaire was an open question. Students had to state the most important reasons for which they would limit the use of their mobile devices. We organised their answers in Tables 17 and 18 so as their opinions to be better presented. Also, in order to interpret their qualitative answers into numbers let assign marks as follows: none = 0, enough = 1 and very much = 2. Then, the ‘average importance’ can be calculated. On ‘average’, they consider health and money enough as important reasons.

Table 17 Male population given in percentages stating reasons about which they would reduce the use of mobile devices and the ‘averages’ of every category

<i>Male</i>	<i>None</i>	<i>Enough</i>	<i>Very much</i>	<i>‘Averages’</i>
Health	28.40	2.37	69.23	1.41
Lost time	97.63	0.00	2.37	0.05
Recollection	89.94	2.96	7.10	0.17
Addiction	97.63	0.00	2.37	0.05
Alienation	89.35	0.00	10.65	0.21
Economic reasons	68.05	0.59	31.36	0.63

Table 18 Female population given in percentages stating reasons about which they would reduce the use of mobile devices and the ‘averages’ of every category

<i>Female</i>	<i>None</i>	<i>Enough</i>	<i>Very much</i>	<i>‘Averages’</i>
Health	24.65	1.86	73.49	1.49
Recollection	93.02	1.86	5.12	0.12
Alienation	90.70	0.93	8.37	0.18
Economic reasons	74.42	0.93	24.65	0.50

The majority of men (69.23%) and women (73.49%) would reduce ‘very much’ the usage of their devices because they believe that their health could be damaged. Economic concerns were also mentioned by a respectful percentage of students. The 31.36% of men and the 24.65% of women would limit ‘very much’ the use of their mobile so as to have lower bills and pay less money. Finally, a small percentage of men (10.65%) and women (8.37%) would reduce the use of their mobile in order to meet people and discuss issues face-to-face and not via their mobiles.

Most participants do not worry about other reasons. For example, they do not consider that using their mobiles is a loss of time. Also, they do not need time-without-mobiles in order to have peace of mind. Finally, they do not worry of being addicted to their mobiles.

As mentioned before, it is noticed that males tend to use computers slightly more than their female peers. This is also reported in other surveys (Collis and Williams, 1987; Makrakis and Sawada, 1996; Smith and Necessary, 1996; Shashaani and Khalili, 2000). Moreover, men tend to be more intensive internet users than women (Bimber, 2000; Ono and Zavodny, 2003) as they deal more with internet services. On the other hand, other researches reported that men and women deal with computers and internet the same (Jennings and Onwuegbuzie, 2001; Shaw and Gant, 2002) and one found females to possess more positive attitudes than males (Zhang, 2002). In our survey, both groups use more hours TV, DVD and video than the rest of the devices while in another survey there was found that participants used most the cell phone (Switzer and Csapo, 2005). Furthermore, in another survey economical and health reasons are mentioned as obstacles in the use of mobile devices (Trifonova, Georgieva and Ronchetti, 2006). Finally, we found that most women and men send and receive the same number of messages from their love partners, but women send and receive more SMS from friends. It was reported in another study that women not only tend to send and receive more messages from friends, but also from boyfriends (Doring, Hellwig and Klimsa, 2004). In our study, the differences between genders are not too big and tend to vanish, something that is indicated in the results of other similar studies (Ling, 2000; Shaw and Gant, 2002; Mitra et al., 2005).

4 Conclusions and future research

There is a need to understand and evaluate better the usage of mobile devices used by the student population. Students make their own choices and have their preferences regarding the services and characteristics of mobile devices. It appears that there could be a tension between what designers of devices and instructors believe that is essential and what users consider being important for them. As pointed out earlier, universities need to become leaders in applying technology to daily life and education. Moreover, there are many issues that have not been fully addressed. Students have to learn how to use all the device's features and they need support and help so as to be successful in this.

Students in Greece use their mobiles mostly for phone calls and messages. This might happen due to their lack of knowledge and experience in using other functions and services of their mobiles. It may also happen because their devices lack such functions and services or they cost too much. Generally, a lot of research is still needed in order to perform cross-national comparison worldwide (Turel and Serenko, 2006). According to the results, most students do not deal with many of the devices' operations and features. They prefer simple services such as SMS and calls and some of them also take photos, record videos and activate reminders. This might be attributed to the high cost of services or even students' inexperience. Generally, both genders do not use the internet and they do not send or receive e-mails via their mobiles. As mentioned before, students might need guidance so as to use their devices' operations appropriately. This is important as their daily life may be facilitated from many aspects. It is also reported (Comscore, 2007) that although 63% of US mobile users own phones with internet connectivity

capability, only 17% of them subscribe to their carriers' internet services. Similarly, Telecommunications Management Group, Inc. (TMG, 2004) reported the top ten nations by percentage of population using mobile phones to access the internet: Japan (29.5%), Korea (24.8%), France (10.5%), Singapore (7.1%), Sweden (7.1%), Germany (6.1%), UK (5%), Finland (4.1%), Norway (3.9%) and Spain (3.4%). We remark the low penetration rates of the mobile internet in the West. One reason would be that the average cost per minute of terminating a call on a mobile network in Europe is more than three times the rate in Asia (TMG, 2005). Low termination rates would enable mobile user to spend more time talking on their phones. Correspondingly, the relatively high prices charged by mobile network operators for Multimedia Messaging (MMS) discourage mobile users from using this service (Vnunet, 2006). So, mobile operators would consider decreasing their mobile internet prices in order to increase the usage. They would also consider the users' worries about health issues.

Manufacturers of mobile devices would consider decreasing the cost of their devices. Currently, advanced mobile phones with internet capabilities are quite expensive (e.g. Nokia N95 costs 590€, and Sony Ericsson P11 costs 500€). They would also consider improving the devices with respect to usability (e.g. increase the screen size). Regarding the most important users' concern, they should consider the users' worries about health issues.

Furthermore, schools would consider including into their classes training on using not only computers and internet, but also advanced mobile devices. They would also incorporate into their teaching methods the use of mobile devices (e.g. outdoors education or experimentation from a distance using mobile devices).

As it is demonstrated in our survey, gender differences exist, but they are not big. Females appear to make more phone calls than male. Moreover, they take more photos and record more sounds than their male peers. In addition, they listen more hours to the radio than men and they tend to send and receive more messages from friends. On the other hand, males tend to use more the computers and internet, but they do not access the internet via their mobile devices. Furthermore, both groups find reasons in order to reduce the usage of their mobiles, but men mention more reasons than women do. They believe that loss of time and addiction are reasons of decreasing the use of the devices. The objective of this study was to explore the preferences and existing modes of the use of mobile devices by Greek University students. This study would be replicated in other countries and cultures. Also, a different sample of respondents (e.g. children and elderly) would be considered. Finally, this study raises important issues about the usefulness of mobile devices and their appropriate use for specific population groups represented among the university students. All things considered, only by learning how to use technology appropriately we can achieve our purposes and make easier our lives. Obviously, further investigation is required to evaluate the results and the differences between the two genders, and generally the needs of students so as to make mobile devices a more effective tool.

A future study would also investigate the reasons (e.g. high cost of mobile device with internet capabilities, high cost of mobile internet services, no knowledge on using them, not interested in using them) regarding the low mobile internet usage.

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