Is mobile learning a resource in higher education? Data evidence from an empirical research in Ticino (Switzerland)

Emanuele Rapetti, Anna Picco, Sara Vannini

New Media in Education Laboratory – Università della Svizzera italiana
www.newmine.org | {rapettie}{piccosca}{vanninis}@usi.ch

Nowadays mobile devices are highly present and well integrated in students' everyday life. People use them for communication, information retrieval and exchange, entertainment, and even for business. But what can be said about learning? This article tries to figure out the importance of mobile devices for students in their learning experience: on one side by giving an insight into current researches in the field of mobile learning, and on the other side by providing data evidence collected in two higher education institutions of Ticino in Switzerland. By analyzing questions such as, which mobile devices do students use for learning, what for, how do they use them and how keen they are to adopt their mobile tools to support their formal learning activities at university. We also explore whether a transfer from informal usage of mobile devices in students' everyday life to more formal applications in learning processes has taken place. So far, this does not seem to be the case. Most students use mobile devices to communicate with peers for

learning-related purposes and very little to directly learn through them.

1 Introduction

In Switzerland – as in most OECD countries – the penetration of digital technologies is very high: For example, in 2008 116,9 mobile phones were registered every 100 people (OECD-CERI, 2011). People can and like to invest in new mobile technologies and integrate them in their everyday activities such as communication, information retrieval and entertainment.

The importance of mobile in learning is worthwhile to be explored – at least – for three reasons. First, mobile learning is said to be part of digital natives' mind set (Prensky, 2006). Then, mobilization of knowledge and learning can be considered paradigmatic to understand the Knowledge society (Castells, 2000). Finally, it is a matter of reflection if the ability to transfer skills from informal contexts of learning to formal ones is part of the 21st century skills toolkit (Ananiadou & Claro, 2009).

Researchers are thus wondering what the value of mobile devices currently is in the learning process of students at universities (Brown, 2010). Has the high penetration rate of mobile technologies a positive effect on students' learning attitudes? Are today's students more mobile in their learning activities thanks to the new technologies available? And do students appreciate the advantages of mobile devices during their studies?

In order to explore their practices of use, these questions will be addressed not from a technological, but from a socio-communicative and educational point of view with the help of a study called "Learner's voices at USI-SUPSI"[1], carried out in two higher education institutions Ticino (Switzerland) in 2009 (Tardini *et al.*, 2010).

With the goal of understanding, from the learner's perspective, how Information Communication Technologies (ICTs) and e-learning are changing practices and expectations about learning (Rapetti *et al.*, 2010), this study analyses behaviors regarding mobile technologies based on questions of an online survey. Aspects related to mobile had never been considered in previous publications.

Researchers have therefore empirically tested the following 3 hypothesis:
1. In a country like Switzerland, where mobile technologies are widely adopted, do students well integrate them in their learning activities?
2. Do students appreciate the possibility to adopt mobile devices to support their studies as one could expect?
3. Is it possible to speak about a natural transfer from the informal use of mobile devices in students' everyday life to more formal applications

---

[1] USI: Università della Svizzera italiana. SUPSI: Scuola Universitaria Professionale della Svizzera italiana

in their learning processes?

The expression "mobile learning" in this article refers to "the exploitation of ubiquitous handheld technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning" (see the MoLeNET initiative[2]). For this scope, we have considered broadly as "mobile devices" all devices such as mobile phones, laptop computers, netbooks and smartphones. In some questions, however, we have focused either on the use of mobile phones as the most representative mobile device, or on the use of laptop computers (mobile) when in comparison to desktop computers (non-mobile).

In order to frame our results within this topic, we will provide an overview of current research activities in the field of mobile learning.

2 The growing debate around mobile learning

Over the last few years, mobile devices have undergone continuous improvement, thus becoming increasingly capable and flexible. Indeed, mobile technologies have seen significant growth in their use around the world. At the same time with the advent of so called "smart" mobile devices, always more functionalities are condensed in one and the same object, thus giving live to the first generation of "truly portable ICT" (Peters, 2009). Within a society where mobility is ever more relevant, mobile technologies respond to the need of contextualized and just-in-time content delivery.

Implications of this phenomenon in the learning process are currently being considered by scholars, who do not seem to yet converge on a unique definition of mobile learning. Nevertheless, they recognize some particularly relevant characteristics for mobile learning:

1. Learners are on the move, both physically and in other ways, for example among different devices, in and out of engagement with ICTs, and over time (Sharples *et al.*, 2005);
2. Mobile learning is ubiquitous for its nature (*Ibidem*);
3. It is contextual and suited to support context-specific learning (Traxler, 2009);
4. It is mainly personal (Ibidem; Peters, *op.cit.*);
5. It is immediate (Scanlon *et al.*, 2005; Traxler, *op.cit.*);
6. It mainly takes place outside formal learning situations (Sharples *et al.*, *op.cit.*; Traxler, *op.cit.*), although recent examples showed that it can also be capitalized in formal academic settings (EDUCAUSE, 2010).

---

[2] http://www.molenet.org.uk/

On their side, then, education institutions seem to face a unique opportunity to have an impact on learners in new and compelling ways: both in formal and informal learning environments learners can use mobile technologies to access additional and customized materials. Communication and data transfer possibilities created by mobile technologies can significantly reduce dependency on fixed locations for both work and study, and thus have the potential to revolutionize the way we work and learn (Peters, *op.cit.*).

But do students of higher education campuses take advantage of these opportunities? Not many studies that try to take into account the voice of the learners have been found (Clough *et al.*, 2008), especially when it comes to consider higher education environments.

3 "LV@USI-SUPSI" – Methodology

"Learners' voices at USI-SUPSI" is a research project carried on by the NewMinE[3] and Elab[4] during the winter semester 2009. Its goal was to understand how ICTs and e-learning are changing practices and assumptions about learning from the learners' perspective (Rapetti *et al.*, 2010).

Data were collected through an online survey based on the protocol of the JISC Consortium (2009), adapted to Ticino context and tested in a previous phase. It was addressed to all students of the two university institutions (USI and SUPSI) of Ticino,; they number 4449 international students of both sciences and humanities backgrounds.

A total of 562 surveys were collected.

To quantitatively determine the statistical significance of our sample set of the student population, we used the following formula:

$$n = \frac{N \cdot \hat{p}\hat{q}\,(z_{\alpha/2})^2}{(N-1)E^2 + \hat{p}\hat{q}\,(z_{\alpha/2})^2}$$

This formula includes the finite population correction factor, because we consider populations that are statistically relatively small. N is the size of the considered population (i.e., 4449 students); pˆ is the expected proportion of students having a feature (i.e., using mobile devices for learning), while qˆ is $(1 - pˆ)$ (i.e., students not using mobile devices for learning); E represents the margin of error to be considered, and zα/2 is the critical value [1] associated to the chosen confidence level. In our experiment, since the proportion (pˆ) of

---

[3] NewMinE: New Media in Education Laboratory (Università della Svizzera italiana, Lugano Switzerland)

[4] Elab: ElearningLab USI-SUPSI (www.elearninglab.org)

students showing a certain behavior is not known a priori, we consider the worst case scenario (i.e., $\hat{p} \cdot \hat{q} = 0.25$). Thus, we measure that our sample set size gives us a confidence level of 99% and error (E) of 5%: If a feature is shared among f% of the sample set students, we are 99% confident that the feature is present in the f%±5% of the whole population of students. This validates the quality of this sample set as an exemplification of the entire population (Triola, 2006).

In this article we will focus on the analysis of the questions about usage of mobile devices by the students, which have never been considered in previous publications by the authors. As abovementioned, "mobile devices" in this study include all devices such as mobile phones, laptop computers, netbooks and smartphones. In some questions, however, the authors gave particular focus either to the use of mobile phones (considered as the most representative mobile device) or to the use of laptop computers (when in comparison with non-mobile desktop computers).

4 "LV @USI-SUPSI" – Main results on mobile

4.1 The "top 10" ICTs for studying

Fig.1 shows the 10 digital technologies and online applications students declared to prefer when studying. Respondents could choose among a list of 29 items (both software and hardware) that included all ICTs used (or customizable) for learning.

Mobile phones per se are only used by less than half of the respondents (42.5%) and score only the 10th place and, thus they do not seem to play a predominant role for studying. On the other hand, results show that students frequently use their computers for studying. Laptop computers (86.1%) are clearly preferred over the more static desktop computers (48.8%) when it comes to support learning activities, possibly meaning that students do not want to be tied to one place to study and prefer mobile devices' flexibility. However, they seem to prefer mobile technologies that are similar to traditional technologies to smaller devices. The importance of mobile phones for studying might increase in the future as they gradually become more and more "smart" providing simple and always more affordable internet access and thus enabling an easier mobile use of search engines, which results to be the most important technology (90.6%) for the students when it comes to sustain learning.
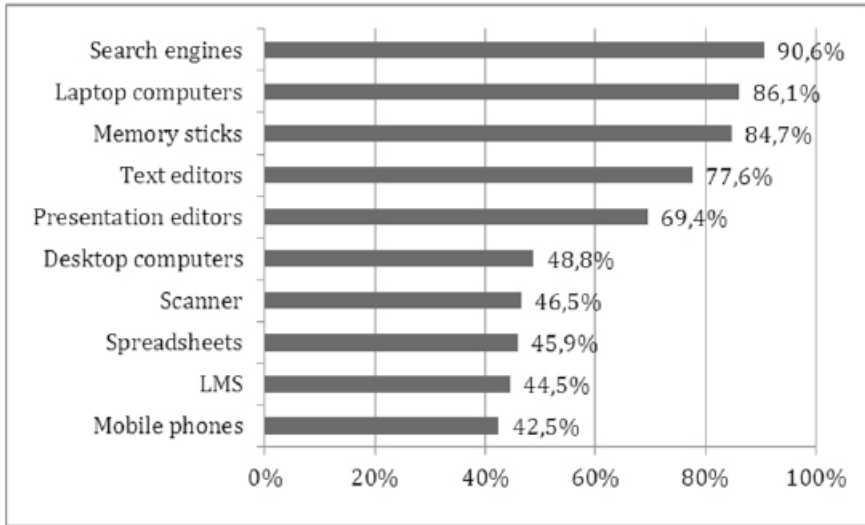
Fig. 1 - The 10 technologies most used for studying (510 respondents, multiple answers allowed)

It is also worth mentioning what students declared to use ICTs for in their studies: Data shows that technologies are an important support tool for information retrieval activities such as gathering information (63.6% of respondents), look up course material (59.3%) and downloading materials (55.2%). Students also use technologies in order to facilitate communication both with their friends (49.2%) and their university colleagues (39.7%). Finally, ICTs play an increasingly important role for collaboration: 39.3% of respondents share materials online, 28.7% use technologies to plan group learning tasks and 27.3% to do learning tasks collaboratively. Even though they referred to ICTs in general, these are the reasons why also mobile technologies are important in student's activities and should be taken into account when analyzing and planning mobile learning studies.

4.2 ICTs for interacting

Fig.2 provides further evidence that mobile phones have a relevant role when it comes to collaboration within a group project. Mobile phones' importance for collaboration can be explained by their flexibility, ubiquity and informality. It seems clear that in this case the boundaries between study and leisure in the use of the technology are overcome, as three out of four respondents declared to use mobile phones to interact with their peers (most probably through calls and texts). However, e-mail is still the most used technology to
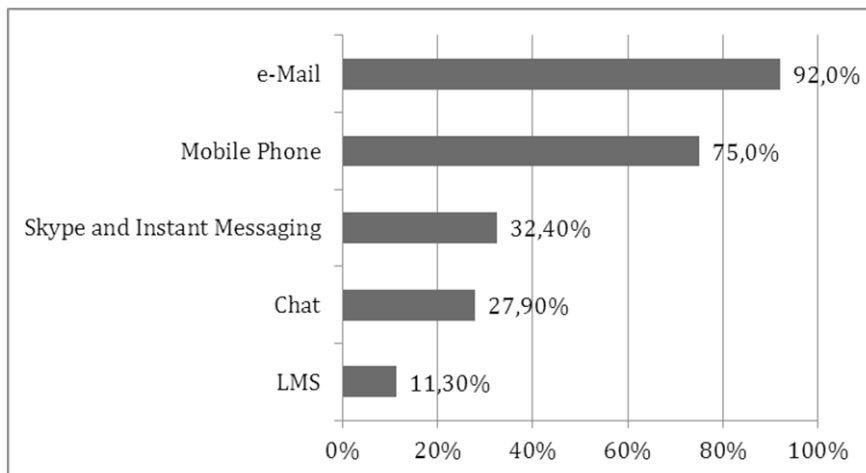
interact within a group project.

Fig. 2 - Preferred ICTs to communicate with group project peers (512 respondents, multiple answers allowed)

4.3 Where do they study?

Students were also asked about where they usually study. Results above-mentioned seemed to indicate that mobility and flexibility could have a role in the choice of the technologies used. However, most respondents stated that they mostly study at home (69.9%) or at the university's lab (46.6%), both places where there is no real need for mobile devices (university's laboratories are generally well equipped). 17.4% of the respondents answered that they study in places of the university where no standard equipment can be found (the bar, the garden…) and where the use a portable device have a point.

A minority of respondents (11.7%) study in places which are neither their home nor the university (on the bus, in the train,…). Fig. 3 shows that the percentage of students that declared to use their laptop or their mobile phone for studying and that declared in the meantime to study on public transports is also very small (53 people, that is 9,4% for laptop; and 23 people, that is 4,1% for mobile phones) which probably means that owning these devices does not significantly change their study behavior.
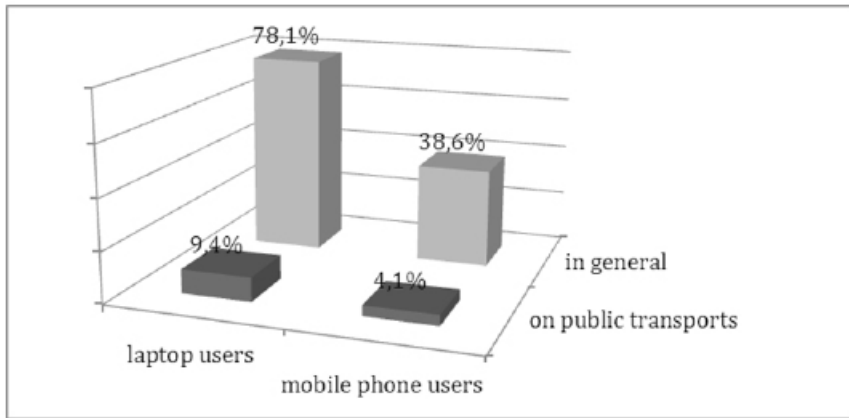
Fig. 3 - Percentage of laptop/mobile phone users among students, both in general and among the ones studying on public transports.

This data suggests that mobile technologies (laptops instead of desktop computers) are not a real need for students when taking into consideration the place where they study: What seems to play a more important role to them is the fact that these devices are usually more personal than non-mobile ones.

4.4 Are mobile-designed learning tools attractive to students?

As showed in Fig.3, about one third of the respondents consider important or very important the option to access learning via mobile tools. The remaining two third, however, don't seem to appreciate this feature. Thus, although an increasing interest in using mobile phones for learning is possibly being registered, mobile-designed applications do not seem to be particularly preferred by the others (at least, in our research).

Furthermore, if we consider only the students that declared that they use mobile phones in their studies, again only about a third of them think it is important (17.3%) or very important (18.5%) for a learning tool to be mobile. This fact lead to the consideration that mobile phones are less used to directly learn with them and more to communicate with peers for learning-related purposes; which does not confirm entirely the hypothesis that a transfer from the informal use of mobile devices in students' everyday life to more formal applications in their learning processes would have naturally taken place.
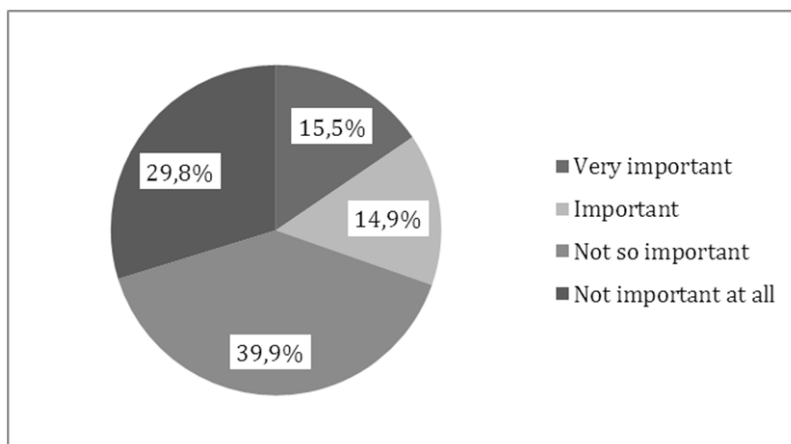
Fig. 4 - importance of accessibility via mobile when choosing a learning tool (484 respondents, single answer)

Conclusions

Mobile devices are pivotal in students' everyday life and mobile technologies are expected to play a bridging role between informal and formal practices of learning. However, their role in supporting students' learning activities does not seem to be as relevant yet. And it seems more consistent to consider mobile devices to have an alongside role, regarding learning experiences.

Data collected in the two universities in Ticino (Switzerland) within the project "Learners' voices at USI & SUPSI" brought evidence that the informal everyday usage of mobile devices has not been naturally and completely transferred to formal learning activities yet. It appears mostly related to communication and collaboration, so that no real transfer of practices and abilities to more formal learning practices seems to have occurred.

Also, students do not seem to choose the applications and tools to learn based on the availability of the same application for mobile devices. Finally, students seem to prefer the usage of laptop computers instead of desktop computers even though no real need of flexibility in terms of location emerges. A shift towards the use of more portable devices has indeed taken place, but this can be attributed most probably to more personal and customizable nature of mobile objects.

This study was carried out in Ticino, Switzerland, within a significant sample of international students with both sciences and humanities backgrounds. It would be interesting to extend the study to students of other European and extra-European realities.

Further researches should be carried on to explore more in depth the transfer of skills and habits from informal contexts of learning experiences – thanks to mobile devices – to formal ones. As a matter of fact, data evidence from our research shows that this transfer is not happening naturally, especially in institutions that do not foster and support their usage for learning (like it is the case for this study). A comparison with institutions which push these kinds of activities is needed.

REFERENCES

Ananiadou K. & Claro M. (2009), *21st century skills and competences for new millennium learners in OECD countries: OECD Education Working Papers - Documents De Travail De l'OCDE*,1-34.

Brown J. S. (2010), *Learning for a World of Constant Flux*, University Research for Innovation, Economica.

Castells M. (2000), The rise of the network society (2a ed.), Oxford etc.: Blackwell Publ.

Clough G., Jones A.C., Mcandrew P., Scanlon E. (2008), *Informal learning with PDAs and smartphones*, in Journal of Computer Assisted Learning, Vol. 24, No. 5.

EDUCAUSE (2010), *7things you should know about mobile apps for learning*, In Internet: http://www.educause.edu/Resources/7ThingsYouShouldKnowAboutMobil/204763.

Frankola K. (2001), *The e-learning taboo: High dropout rates in online courses*, Syllabus, 14(11), 14-17.

JISC consortium (2009). *The learners' voices project outcomes*, In Internet: www.jisc.ac.uk/whatwedo/programmes/elearningpedagogy/learneroutcomes/learnervoices.

Margaryan A., Littlejohn A., & Vojt G. (2010), *Are digital natives a myth or reality? university students' use of digital technologies*, Computers & Education, 56(2), 429-440.

Oblinger D. & Oblinger J. (2005), In Oblinger D., Oblinger J. (Eds.), *Educating the net generation EDUCAUSE*, In Internet: www.educause.edu/educatingthenetgen.

OECD-CERI (2011), *Trends Shaping Education 2010, Paris*, OECD Pub., Ch. 5.

Peters K. (2009), *M-learning: Positioning Educators for a Mobile, Connected Future*, in Ally M., Mobile Learning, Transforming the delivery of Education and Training, AU Press, Athabasca University.

Prensky M. (2006), *"Don't bother me mom, I'm learning!": How computer and video games are preparing your kids for twenty-first century success and how you can help! (1st ed.)*, St. Paul, Minn.: Paragon House.

Rapetti E., Ciannamea S., Cantoni L., Tardini S. (2010), *The voice of learners to understand ICTs usages in learning experiences: A quanti-qualitative research project in Ticino (Switzerland)*, Proceedings of World Conference on Educational

Multimedia, Hypermedia and Telecommunications 2010, Toronto. (pp. 2527-2536).

Scanlon E., Jones A., Waycott J. (2005), *Mobile technologies: prospects for their use in learning in informal science settings*, Journal of Interactive Media in Education.

Sharples M., Taylor J., Vavoula G. (2005), *Towards a Theory of Mobile Learning*, in Proceedings of mLearn 2005, University of Birmingham UK & The Open University, UK.

Tardini S., Rapetti E., Ciannamea S. & Meschitti V. (Eds.) (2010), *Learners' voices @ USI-SUPSI. Lugano (Switzerland): Università della Svizzera italiana e Scuola Universitaria Professionale della Svizzera italiana: Elab & Servizio Gender*, In Internet: http://www.equality.usi.ch/rapporto-learners-voices-123371.pdf.

Traxler J. (2009), *Current State of Mobile Learning*, in Ally M., Mobile Learning, Transforming the delivery of Education and Training, AU Press, Athabasca University.

Triola M. (2006), *Elementary Statistics*, 10th ed. Addison-Wesley.

All the online references have been verified the 15th of May, 2011.