IMPROVING ICT SKILLS OF STUDENTS VIA ONLINE COURSES

Rozita Tsoni, Jenny Pange
University of Ioannina
Greece

Abstract

Prior knowledge and ICT literacy are very important factors in the learning process. A pilot study was conducted in a self-selected group of students in the School of Education, in the University of Ioannina in order to improve their ICT skills via online courses. It was found that the majority of undergraduate students had sufficient capability in ICT usage and frequent Internet access. Only few of them had acquired this knowledge in formal secondary education. Moreover they appeared to be able to control their learning (self regulated learning skills). A large number of them believed that they didn't have the appropriate prior knowledge for getting their degree. They preferred to have had some additional tutoring in order to improve their performance. They wanted courses to be transmitted via mobile devices. The content of these courses combines prior with current learning material and we may call them *bridge courses*. Results of this study revealed that bridge courses can be helpful.

Introduction

Students attend university courses with diverse skills and prior knowledge. This diversity causes heterogeneity in classes and it poses challenges for university education, as differences in prior knowledge have been shown to influence the quality of learning and student achievement in a significant manner (Dochy, 1996). In Greece students have to pass certain exams in order to enter university. Accordingly, students who attend the same department have similar entering scores. Yet they have different academic achievements depending on their focus on different courses in their high school studies. This fact indicates variation in prior and informal knowledge levels that can be justified by their different educational background. UNESCO (2008) emphasizes information and communications technologies (ICT) literacy of teachers. ICT may be viewed as a technological tool providing the change from a mechanistic to a humanistic view of education through developing learner-tailored curricula and decentralizing learning in time and space (Chen 1995, Pange, Lekka, & Toki, 2010). ICT related courses are included in every curriculum of Greek Schools of Education. According to recent studies in Europe, although ICT use is well established in the educational process, the level of familiarity of the users is quite a bit lower than expected (Endrizzi, 2013). Students use only specific applications mostly related to communication and entertainment and fewer concerning their education. Their low performance in ICT-related, undergraduate courses implies a gap in prior knowledge. According to Ellis and Salisbury. (2013) the prior experience of students in ICT is not as useful for their studies as might be expected. Moreover Bundy (2004) stressed the significance of ICT literacy as an ability related to more sophisticated intellectual skills. On the other hand,

students need basic ICT literacy and meta-cognitive skills in order to be able to attend online courses to improve their ICT skills in a more advanced level. *Bridge courses* are online courses whose content bridges the gap between high school knowledge and university knowledge. These courses include subjects that are not included in the high school or in the university's curriculum. Specifically they contain basic use of Word, Excel, PowerPoint and Internet navigation. Also, links to relevant open educational material are provided, in order to help students and promote the use of the Internet for educational purposes.

This study was designed to evaluate the need and readiness of students in attending extra courses to improve their ICT skills. It is the preliminary stage of a bigger project aiming to improve students' academic performance. In this case study we were focusing in assessing basic ICT skills and also in frequency of use.

The Open University of UK in its official website describes the skills needed to attend an online course. Most of these skills concern metacognition (Open University, 2014). *Metacognition* is the ability to understand, reflect upon, and control one's learning (Schraw & Dennison, 1994).

Metacognition and self-regulation are two very important factors that affect students' ability to learn. If the levels of students' metacognition are low, it would be quite difficult to use online, self-paced courses to improve their skills. On the other hand, self- awareness is insufficient if there is a lack of fundamental skills. However, it can produce a readiness that it is essential for personal change (Pange, 2013; Zimmerman & Schunk, 2001). Considering this fact, it became obvious that it was necessary to assess students' levels of metacognition. In Greece we didn't find any recent intergraded research concerning the use of online bridge courses and its correlation with ICT performance of undergraduate students. The aim of this study is to investigate if there is need for online ICT courses and whether students are ready and willing to attend them.

Materials and Methods

The study was conducted at the School of Education, in the University of Ioannina during the academic year 2012- 2013. A self-selected group of undergraduate students participated. We gave out 110 questionnaires and collected 93 fully completed (response rate 84.5%). This process took place in the beginning of the semester by distributing the questionnaires to the students at the end of lectures of ICT-related courses.

The questionnaire consisted of two parts. The first part was created to cover the issues of prior knowledge and informal learning. This part included questions concerning the demographic characteristics of the participants. In order to assess students ICT skills general questions were addressed. The questions concerned Internet use, the use of specific software such as PowerPoint, the use of email, the use of the university's online library.
 In the second part we chose to use an already tested questionnaire in order to have accurate and reliable results. We chose the MAI questionnaire (Schraw

& Dennison, 1994) as the most relevant to our goals. We retrieved it from *http://www.harford.edu/~/media/PDF/StudentServices/Tutoring/Metacognitio n%20Awareness%20Inventory.ashx* and used it according to its terms of use. The MAI questionnaire consists of 52 question of self-evaluation of metacognition. It measures the awareness of students' metacognition in their learning process. The questions refer to students' education experience in general. Questions were categorized in four groups. The sum of these questions formed a score for each group and each student that indicated the level of the relevant skill. This process was necessary for avoiding having 52 different results. Instead, by grouping the answers we have the overall picture of the evaluation. The categories are:

1) *Information management strategies*. Students having information management skills are intentionally use learning strategies

2) *Comprehension monitoring*. Refers to the awareness of their understanding.

3) *Planning*. Involves time management and organizing skills

4) *Evaluation*. Students with evaluation skills can analyze the effectiveness of their learning process.

The questionnaire was initially tested on a small group of 20 students. Some minor changes were made, and the final version was created. For analyzing the data we used SPSS 10 software. Means and z tests were used as needed. Of the participants: 91 were females and 73 were in the third year of their studies. Their age ranged from 19 to 26 years old. We excluded two participants who were above 40 years old.

Results and Discussion

Students had graduated from high school with an average grade of 17.6 out of 20. All participants used the Internet: 59.1% of the students used Internet for issues related to their studies often; 90.3% of them used it every day for other purposes. The use of email was less common. Only 23.7% used it every day, and 35.5% used it rarely or hadn't used it at all. Concerning other basic ICT skills, we found that 95.7% knew how to print a file, and 69.9% could create a PowerPoint presentation. Almost all (93.5%) said that they were able to use the Internet in order to find information needed for their university courses, but only 62.4% could evaluate the reliability of the information retrieved from the Internet. Also more than half (54.8%) of the students didn't use the university library.

Apparently students have a good level of ICT usage skills, but there is still need for further improvement. It is obvious that students used more technology in their everyday life than for educational purposes: e.g., 90.3% used the Internet on an everyday basis for entertainment, but only 23.7% used it every day for course related subjects (Figure 1). We used z-tests to check the validity of the result. The z-score is 10.1124. The p-value is 0.00. The result is significant at $p < 0.05$.
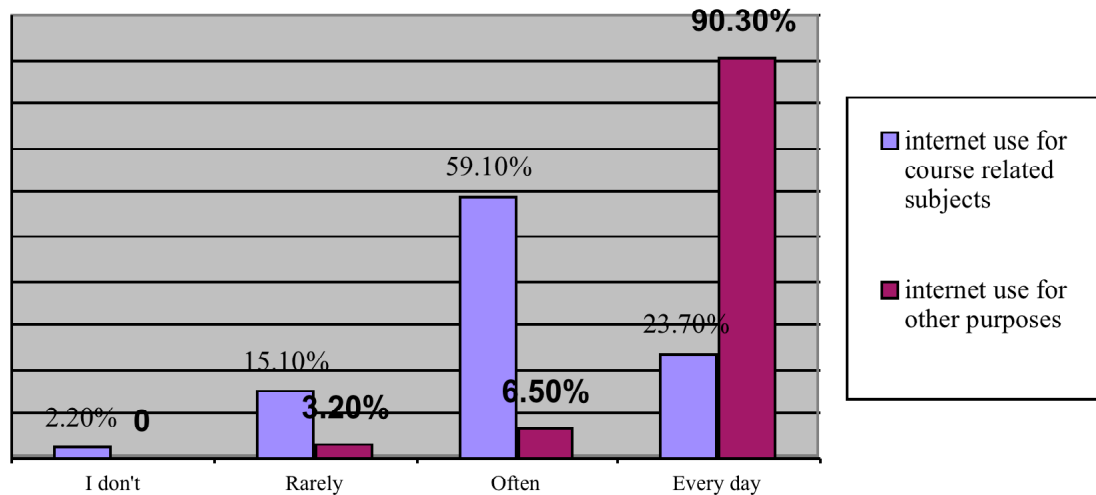
Figure 1. "How often do you use the Internet?"

In the questions concerning the type of education (formal, non-formal or informal) by which students gained their knowledge we found that ICT knowledge was mainly acquired through non-formal (private tutoring) and informal (mainly from friends and family) education. Specially, 54.8% learned how to use ICT (printer and other computer peripherals) from family member, friend, or private tutoring, and 28% learned in secondary school. This is a statistical significant result. (The Z-Score is 4.755. The p-value is 0.00.) Moreover, 38.7% of the participants   learned how to use email from family member, friend, or private tutoring and only 15.1% in secondary school, which was also significant different (The Z-Score is 3.8769. The p-value is 0.0001). Additionally, 37.6% learn how to use PowerPoint from family member, friend, or private tutoring and 23.7% in secondary school. (The z-score is 2.1776. The p-value is 0.02926.) All z-tests above are indicating that the differences between the results are significant and strengthen their validity. According to their answers, 40.9% of the students became familiar with the Internet in secondary school and 29% in their home by a member of their family. This result is not significant. (The z-score is 1.9621. The p-value is 0.05.)

Almost half of the students learned how to use a computer through informal education as it is shown in Figure 2.
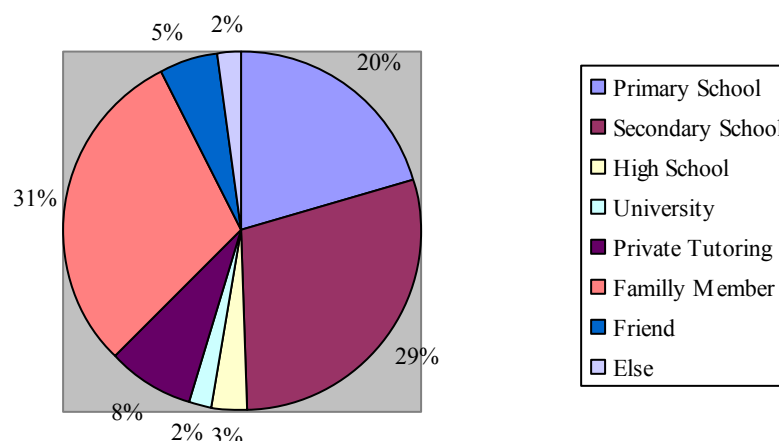
Figure 2: "Where did you learn how to use a computer?"

Students were asked to clarify their answer in the case they chose to answer "elsewhere." A very interesting finding had occurred: In most cases they declared that they had learned how to use email or PowerPoint through the internet although that was not a given option, indicating that they enjoy learning online.

In the MAI questionnaire we found that 44,1% of the students valued their planning skills, with 10 out of 10. Also, 56% were confident about their comprehension monitoring level (scores above 6 out of 8). The category that students had the lowest scores was "information management strategies" where only 15,1% of them were sure about their abilities. The scores are presented in table 1.

Table 1

MAI Scores

Information management strategies		Comprehension monitoring		Planning		Evaluation	
Score	Percentage	Score	Percentage	Score	Percentage	Score	Percentage
>5/10	9.7%	3/8	3,3%	2/7	3,2%	2/7	3,2%
6/10	15.1%	4/8	9,7%	3/7	5,4%	3/7	9,7%
7/10	16.1%	5/8	12,9%	4/7	10,8%	4/7	17,2%
8/10	25.8%	6/8	18,3%	5/7	14%	5/7	19,4%
9/10	18.3%	7/8	28%	6/7	22,6%	6/7	23,7%
10/10	15.1%	8/8	28%	7/7	44,1%	7/7	26,9%

Although these categories provide a collective picture of the metacognitive skills that students credit to themselves, some results are worth mentioning individually. Of the students, 95.7% agreed with that they learned best when

they knew something about the topic. This fact confirms the significance of prior knowledge in the learning process. Only 36.6% of the students knew what the teacher expected from them to learn. A plausible cause might be the lack of effective communication between students and teachers or the lack of clear definition of learning goals. Some additional questions were asked in order to determine the need of extra courses as well as students' readiness to attend them.

Apart from MAI questionnaire we got replies in extra questions concerning formal education, prior knowledge and students' intention to attend extra courses.

Only 11,8% of the students answered that prior knowledge gained in high school could help them to their studies, while 54,9% admitted that they had gaps and needed help. This finding is very important for our study because it indicates the need for extra courses in order to cover students' need for extra help. Moreover 15,1% of the students believed that they gained most of their prior knowledge needed in university studies in high school. Considering students' intention to attend *bridge courses* in order to improve their ICT skills, 85,8 % answered that they were willing and 14,2% were not. This difference is considered statistically significant. (The z-score is 10.4507. The p-value is 0.00). Furthermore, 87.1% of the students owned a mobile device that they could use in order to attend online courses.

All of the students were familiar with Internet use, and 90% of them used it every day. Additionally they were able to retrieve information when they need it for their courses. Yet, nearly 38% of them are unable to evaluate on their own the credibility of this information. Also there were 15% that did not know that Google is a search engine. Apparently students use Internet more for communication and amusement than for educational purposes: only 45,2% used the online library. However, 70% of the students are able to create a PowerPoint presentation without help. It is interesting to mention that a small yet existing part of the students (4,3%) did not know how to print a file, probably due to their tendency to use their mobile phone for Internet access. Moreover more than half of the students were not confident about its background knowledge.

According to our findings, family and friends are the main source of technical education for Greek students although ICT is an existing part of formal education from the preschool level. Students are very familiar with private tutoring either by members of their family or by teachers.

Additionally they have control over their learning. They manage their time appropriately and have the ability to set goals. Their scores were quite a bit lower regarding their ability to choose and adapt learning strategies. All characteristics above are essential for successful participation in an online course.

Conclusions

In conclusion this study reveals that although students are familiar with ICT and use the Internet very often, there is a small but not negligible group of students lacking basic ICT skills. This confirms our initial hypothesis that there is a gap in prior knowledge and that there is a need to reinforce the level of ICT literacy. Moreover the majority of students are not confident about their prior knowledge, and they admit the need for further ICT training. They are willing to take online courses to improve their skills, and most of them own a mobile device that can be used for attending these courses.

The validity of informal learning in ICT use has been also recognized by Kampylis, Boccon, & Punie (2012) in their study about ICT- enabled *innovation for learning*. Also, according to Geer (2012), students expect to use a variety of technologies in their learning--as many as they use in their everyday life, which is similar to our findings. Therefore the use of extra online courses could cover students' additional need for ICT training. Endrizzi (2013) stressed that the impact of metacognition in the learning process is very important. Our results imply that students have the basic skills needed to attend extra courses in the form of online courses, since they have the basic ICT literature and levels of metacognition that allow them to be self-regulated learners. Thus students have the means and the ability to attend self-paced online courses in order to bridge their gaps and improve their skills.

The limitations of this study were the small number of participants as it was applied to a specific group of students, at a given time and place. We intend to repeat this study on students of other Greek universities, in a larger scale, as a preliminary study followed by the implementation of the extra online courses that we call *bridge courses*. After the implementation, a final survey will provide us with feedback about their effectiveness.

References

Bundy, A. (2004). One essential direction: Information literacy, information technology fluency. *Journal of eLiteracy*, *1*(1), 7-22.

Chen, D. (1995). Guiding principles for instruction and program development. In D. Chen, & J. Dote-Kwan (Eds.), *Starting points. Instructional practices for young children whose multiple disabilities include visual impairment* (pp.15-28). Los Angeles: Blind Children's Center.

Dochy, F.J.R.C. (1996). Assessment of domain-specific and domain-transcending prior knowledge: Entry assessment and the use of profile analysis. In M. Birenbaum, & F .J. R.C. Dochy (Eds.), *Alternatives in assessment of achievements, learning processes and prior knowledge* (pp. 227–264). Boston: Kluwer.

Ellis, J., & Salisbury, F. (2004). Information literacy milestones: Building upon the prior knowledge of first-year students. *The Australian Library Journal*, *53*(4), 383-396.

Endrizzi, L. (2012, October). *Digital technologies in higher education: Challenges and opportunities.* Dossier de veille de l'IFÉ ,*78.*. Retrieved from http://ife.ens-lyon.fr/vst/DA-Veille/78-october-2012_EN.pdf

Endrizzi, L. (2013, Dec). Students are not mutants! *Media Learning News*. Retrieved from http://news.media-and-learning.eu/files/ Media-and-Learning-News_2013-12.pdf

Geer, R., & Sweeney, T.A. (2012). Studentsâ ™ voices about learning with technology. *J. Soc. Sci.*, *8*, 294-303. Retrieved from http://www.thescipub.com/abstract/10.3844/jssp.2012.294.303

Kampylis, P. G., Boccon, S., & Punie, Y. (2012). Towards a mapping framework of ICT- enabled innovation for learning (JRC scientific and policy report). Seville: Institute for Prospective Technological Studies (IPTS). Retrieved from http://ftp.jrc.es/EURdoc/JRC72277.pdf

Markauskaite, L. (2007). Exploring the structure of trainee teachers' ICT literacy: The main components of, and relationships between, general cognitive and technical capabilities. *Educational Technology Research and Development*, *55*(6), 547-572.

Open University. (2014). Study skills. Retrieved from http://www openuniversity.edu/ study-skills

Pange, J., Lekka, A., & Toki, E. I. (2010). Different learning theories applied to diverse learning subjects: A pilot study. *Procedia - Social and Behavioral Sciences, 9*, 800-804.

Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary educational psychology*, *19*(4), 460-475.

Siolou E., Sypsas A., Geka P., & Pange J. (2013), Adoption of information and communication technologies in higher education institutions. *9th HSSS National and International Conference Proceedings,* Volos, Greece.

UNESCO. (2008). *Media and information literacy curriculum for teachers*. Retrieved from http://www.unesco.org/new/en/communication-and-information/resources/publications-and-communication-materials/publications/full-list/media-and-information-literacy-curriculum-for-teachers/

Zimmerman, B. J., & Schunk, D. H. (Eds.). (2001). *Self regulated learning and academic achievement: Theoretical perspectives* (2nd ed.). Mahwah, NJ: Erlbaum.

Author Details
Rozita Tsoni,
 rozitson@yahoo.gr

Jenny Pange
jennypagge@yahoo.gr