

ORIGINAL PAPER

The Use of Information and Communications Technology from the Educational Staff of the Nursing and Physiotherapy Departments of the Alexander Technological Educational Institution of Thessaloniki, Greece

Theodora Tzitzolaki, BSc, MSc, RN

Supervisor Nursing Department, Nursing, Alexander Technological Educational Institute of Thessaloniki, Greece

Maria Tsiligiri, MD, PhD

Assistant Professor, Physical Therapy Department, Alexander Technological Educational Institute of Thessaloniki, Greece

Foteini Kostouda, BSc

Graduate in "Accounting and Finance" of University of Macedonia
Postgraduate Student in "Banking and Finance" of Open University of Cyprus

Correspondence: Tsiligiri Maria, Assistant Professor, Alexandreio Technological Educational Institute of Thessaloniki, Greece, e-mail: mtsilingiri@phys.teithe.gr

Abstract

Introduction: The Information and Communication Technologies (ICT) have already been included in the educational process in both national and European level. However, data on ICT use in Greek universities and Technological Institutes are lacking.

Aim: The purpose of the study was to study the use of ICT tools by the educational staff of two higher technological education departments.

Materials and methods: Ninety members the educational staff of the Nursing and Physiotherapy Departments of the Alexander Technological Educational Institution of Thessaloniki Greece (ATEITH) were included in the study. A self-report questionnaire with closed type questions on Likert scale was used.

Results: Women were the 76.67% of the sample and 68.7% of the participants were over 41 years old. The most frequently used tools were the computers. The tools easier to use were the e-mail, the Word, the computer, the search engines, the internet, projectors, the electronic presentations and the web pages. The easier a tool is incorporated in the teaching process, the more often it is used from the tutors ($r=0.715$ $p<0.001$). Training, material and technical infrastructure, technical support and availability of time were the factors related to the ICT use ($p<0.01$).

Conclusion: The educational staff of the Nursing and Physiotherapy departments of ATEITH often use the ICT tools. They consider them as user's friendly tools contributing to educational process. Unwillingness to use ICT tools may be related either to psychological and training factors or to innate technological difficulties, an issue deserving further investigation.

Key Words: Information Technologies, Communication Technologies, Physical Therapy, Nursing, Educational Staff

Introduction

The modern era is characterized by an abundance of information provided through new technologies. Information management and user's skills are considered as major objectives for modern education. The School of Information Society must be open to continuous improvements in order to cope effectively with the contemporary challenges. The use of ICT in education has been associated with significant pedagogical and educational advances and it is beneficial to the learning process of both students and teachers. Studies have shown that the use of ICT in education contributes to creating incentives and in depth understanding of students, promotes active, collaborative learning and contributes to the development of creative thinking (Ruthven et al., 2004).

The Information and Communication Technologies (ICT) have already been included in the educational process in both national and European level. The incorporation of computers in the tutorial process changes the existing instructive methods, the environments of learning, the roles of the teacher and student, the analytic programs of study and the educational processes. Nevertheless, the extent the Universities and specifically the faculties of Nursing and Physiotherapy have included the ICT tools in their programmes of study and in their teaching remains

University teachers use the ICT tools in a rather static and not dynamic manner (Kisla et al., 2009) as the ICT tools are used mainly for the production, search and transmission of the information and not for communication or interaction purposes (Ten Brummelhuis, 2001; Ministry of Education, Culture and Science, 2002; Van den Dool, 2003), although the latter is observed occasionally in the form of e-mail usage (García-Valcárcel & Tejedor, 2009).

Certain factors influence the use of ICT tools, such as age, sex, material and technical infrastructure, technical support, availability of time, object of study and training (Demetriadis & Vlahavas, 2004; Peeraer και Van Petegem (2010).

Previous research on ICT implementation by Nursing and Physiotherapy faculties showed that these faculties use *Word, e-mail, PowerPoint, chat, forum, internet, websites, LMS, systems of videoconference* etc. (Moule, 2003; Ward & Moule, 2007; Bond & Procter, 2009). These tools are developed according to the special needs and comprise systems and procedures, such as

intelligent systems of teaching, simulations, special informative systems for the management of patients or hospital units (Smedley, 2005; Reime et al., 2008; Pfefferle et al., 2010). Data on ICT use in the context of higher education in Greece are scarce and the present study may provide some information in the field.

The purpose of the present study was to record the ICT tools used by the instructive/educational staff of the Nursing and Physiotherapy Departments of the Alexander Technological Educational Institution of Thessaloniki Greece (ATEITH), to investigate the opinions of the educational staff about the ICT tools and explore which factors influence the use ICT tools by the educational staff.

Methodology

Sampling

The research was carried out in the two departments (Nursing and Physiotherapy) of ATEITH during the spring semester of the academic year 2011-2012. All the 96 members of the Educational Staff working in these departments were included in the study.

Ethics

The Educational Staff were asked if they volunteered to participate in the research during the general meeting of their departments. A brief text at the beginning of the questionnaire was used to inform them about the aim and scope of the research. Written permission was given by the heads of the Nursing and the Physiotherapy departments.

The research tool

As self-report inventory was used with closed type questions regarding the demographic features and the ICT use. The latter was assessed with Likert scale or yes/no questions. Material and technical infrastructure, technical support, availability of time, object of study, training of educational staff and the opinion of the educational staff on ICT usefulness were examined. The questionnaire is available as an additional file upon request.

Research questions

The following research questions were set :

1. Which ICT tools are used by the educational staff of the Nursing and Physiotherapy Departments of ATEITH.?

2. Do the educational staff consider the ICT tools as user's friendly
3. What do the educational staff think about the facility/difficulty of incorporation of the ICT tools into the educational process?
4. What do the educational staff think about the effectiveness of ICT tools in terms of the assistance they can offer to the educational process?
5. Which factors influence the use of the ICT tools by the instructive/educational staff?

Statistical analysis

SPSS PASW Statistics 18 was used to analyse data. Descriptive and inferential statistics were performed. Parametric and non-parametric tests (ANOVA, t-test, the Pearson product-moment correlation and the Spearman's rank correlation) were used as appropriate. Cronbach's alpha was used to test the reliability of the answers. Statistical significance was set at $p=0.05$

Results

Regarding the gender and age of the participants, the 76.67% ($n = 69$) of the participants were women and the 23.3% ($n = 21$) were men, whereas 44.4% ($n = 40$) was between 41-50 years old, 26.7% ($n = 24$) between 31-40 years old, 23.3% ($n = 21$) between 51-60 years old, 4.4% ($n=4$) was up to 30 years old and 1.12% ($n = 1$) was over 61 years old. The majority of the sample ($n = 74$, 82.56%) had attended some program or seminar or had received training on the integration of the ICT tools in teaching. Nevertheless, 17.4% ($n = 15$) had not received any kind of training on the use of ICT tools. Regarding to the training the sample had received, it was found that 85.4% ($n=77$) had attended programs in the field of Health Sciences and the remaining in the fields of the Technological, Humanitarian, Legal and Social Sciences.

The quantitative results of the research are presented below, according to the parts of the questionnaire:

1. The available resources

A. Availability of time:

Only 39.3% ($n = 35$) had time to prepare for the teaching material using the ICT tools. Regarding time to create the appropriate material for their teaching with the use of the ICT tools, 46.7% ($n =$

42) had sufficient free time. The above statements were combined in an one new variable called "Availability of Time", with a mean value of $3,29 \pm 0.86$ in Likert scale (1 = I totally disagree until 5 = I totally agree), thus showing that the sample sometimes had available time while other times it didn't. Cronbach's alpha was used to test reliability of the answer : $\alpha = 0,79$

B. Material and technical infrastructure:

As for the tools available in the departments, projectors, computer labs, internet access, Microsoft Office, Blackboards and personal computers in the tutors' offices were all provided (table 1). When the tutors were asked what kind of ICT tools they owned, it was found resulted that most of them had e-mail account(s), internet access, PC and Microsoft Office (table 2).

C. Technical support:

The ATEITH of Thessaloniki has an Internet Management Centre (A.T.E.I.T.H., 2010) which supports all the departments of the Institution. Only the 25,8% of those who were asked knew the existence of staff in charge to support them technically.

2. The use of ICT tools

Regarding the use of the ICT tools the tutors answered that the most frequently used ICT tools ($4,19 \pm 1.00$) were the computers. Search engines, internet, e-mail, Word, the electronic presentations, the projector and the web-sites were also frequently used. On the contrary, the Forums, the management information systems, chats, the Simulations and the Intelligent systems of education were the less (never or seldom used) used tools (mean value $< 2,18$). The variable "Use of ICT tools" presented with a mean value of $2,95 \pm 0.68$, which means that the teachers usually use the ICT tools during the teaching process (table 3).

Factors related to the use of ICT tools

Gender: The gender was not associated with the use of ICT tools ($p=0.949$). Men and women approximately made the same use of ICT tools.

Age: The age did not influence the use of ICT tools from the tutors ($F_{(4,86)}=0.826$, $p=0.484$).

Training: The tutors who had received some type of training on the integration of ICT tools in their teaching used them more frequently compared with those who had not ever received any kind of such

training (3.01 ± 0.64 vs 2.27 ± 0.71 respectively, $p=0.003$).

Material and technical infrastructure: A statistically significant positive correlation was detected between the available material and technical infrastructure and the use of the ICT tools ($r=0.329$, $p=0.005$): The more material and technical infrastructure is available, the more they use ICT tools during their teaching.

Technical support: The existence of technical support influenced the use of the ICT tools: by the increase of available technical support, the use of ICT tools was also increased ($r=0.306$, $p=0.010$)

Availability of time: The factor "availability of time" influenced the use of ICT tools. It was observed that the increase in availability of time correlated with an increase to the use of ICT tools ($r=0.514$, $p=0.001$)

Tutors' specialty: It does not influence the use of ICT tools ($F_{(3,87)}=0.454$, $p=0.840$).

Table 1. ICT tools available in Nursing and Physiotherapy Department

ICT Tool	%	
	Yes	No
Projectors	97.8%	2.2%
Computer labs	87.8%	12.2%
Internet access	94.4%	5.6%
Microphones or cameras for videoconference	14.4%	85.6%
Programms or informative systems for the management of patients or hospital units	8.9%	91.1%
Microsoft Office (p.e. Excel. Word. PowerPoint)	90%	10%
Education management systems (p.e. e-class. blackboard)	68.9%	31.1%
Computers in the tutors' offices	91.1%	8.9%

Table 2. ICT tools owned by the educational staff

ICT tool	%	
	Yes	No
e-mail	100%	0%
Personal website	17.8%	82.2%
Internet access	96.7%	3.3%
PC	78.9%	21.1%
Patients/hospital management information systems	11.1%	88.9%
Microsoft Office (e.g. Excel, Word, PowerPoint)	93.3%	6.7%
Video conferencing cameras/ microphones	25.6%	74.4%

Table 3. ICT Tool used in teaching

<i>ICT Tool</i>	Mean value	Standard deviation
Computer	4.19	1.0
Projector	3.75	1.25
Word	3.97	1.04
e-mail	4.07	1.06
PowerPoint	3.91	1.15
Chat	1.70	1.05
Forum	1.60	4.03
Internet	4.13	1.09
Web-pages	3.72	1.25
Search machines (Google.Yahoo)	4.14	1.05
Education management systems (e-class. blackboard)	2.79	1.24
Videoconference and tele-education systems	1.55	1.05
Electronical applications	2.90	1.26
Intelligent systems of education	2.18	1.11
Special informative systems for the management of patients or hospital units	1.69	0.97
Personnel management systems	2.06	1.02
Digital material (pictures. videos. vocal documents)	3.25	1.080
Interactive multimedia educational applications	2.74	1.14
Windows	3.27	1.15
CD-ROM	3.13	1.04
Scientific Databases (like CINAHL or Medline)	2.49	1.37
Excel Spreadsheets	2.98	1.15
Interactive questionnaires	2.64	1.22
Simulation	2.15	1.22

3. The manageability of ICT tools

Regarding the manageability of ICT tools, the tools easier to use (mean values between 4,29 and 4,66) were the e-mail, the Word, the computer, the search engines, the internet, projectors, the electronic presentations and the web pages. All the tools above were used always or almost always by the tutors.

Tools like the management information systems, the Forums, the systems of videoconference and tele-education appeared to be difficult to use (mean values between 2,86 and 2,98) and these tools were never, almost never or seldom used by the tutors.

The listed ICT tools were quite easy to use (mean = 3.71 tending to 4 = I quite agree).

4. The facility of incorporation of ICT tools in the teaching process

The tools considered to be easy to incorporate in teaching (mean values between 4.22 and 4.56) were: the PC, the Word, the e-mail, the internet, the search engines, the projector, the electronic presentations and the web pages.

More difficult to be incorporated (mean values between 2.63 and 2.97), were: the systems of videoconference and tele-education, the Simulations, the Forums, the chat, the management information systems and the intelligent teaching systems, were never or seldom used. The ICT tools included in the list appeared to be easy n use (mean= 3.57 tending to 4 = I quite agree). Using the Pearson product-moment correlation coefficient,

a strong positive cross-correlation between the facility of incorporation of the ICT tools and their use ($r=0.715$ $p<0.001$) was found: the easier a tool is incorporated in the teaching process, the more often it is used from the tutors.

5. The reinforcement of the teaching by the ICT tools

All the listed tools the teachers should evaluate can empower the educational process, some of them more and some less. All the tools had a mean value on the Likert scale above 3.0 and the Forum had the lowest mean (3.09), while the PC had the maximum (mean = 4.76).

Discussion

The findings of the present study show that the educational staff of the Nursing and Physiotherapy departments of ATEITH are quite familiar with the ICT tools and they often use them, while certain factors may be associated with ICT incorporation in educational process.

Most of the tutors who participated in the research had received training with regard to the integration of the ICT tools into their teaching. Although the majority of the educational staff had attended programs on the field of Sciences of Health, they answered they did not have enough time available to prepare their teaching with the use of the ICT tools. Finally, it became obvious that, on average, the professors had the suitable material and technical infrastructure for the use of the ICT tools.

Moreover, the ICT tools listed on the questionnaire administered to the professors were considered as relatively easy to use. Those tools easy to use were the computer, search machines, internet, e-mail, Word, power point, the projector and websites. These tools were also most frequently used, as the professors claimed they prefer to use easy tools to save time. As a result, these tools were easily incorporated in the teaching process. However, the question whether tutors that did not use certain ICT tools feel these tools do not reinforce educational process or they consider them as not user's friendly remains. Academic rather than demographic characteristics seem to be related with IT use.

Comparing our results with previous ones, it was found that the ICT tools reported as most frequently used in the present study were the same with those earlier reported (Saranto & Tallberg, 1998; Smedley, 2005; García-Valcárcel & Tejedor, 2009; Jetté et al., 2010; Peeraer & Van Petegem,

2010). Nevertheless, while the simulations were rarely used in our study, this was not the case elsewhere, as shown by other researchers (Corbett et al., 1980; Hanna, 1991; White, 1995; Lamond et al., 1996; Johnson et al., 1999; Cioffi, 2001) who found that some departments of Nursing and Physiotherapy used simulations widely. Regarding the reinforcement of the educational process with the use of the ICT tools, García-Valcárcel and Tejedor (2009) resulted in a similar conclusion with the present study, meaning that the professors considered the ICT tools as necessary, useful, interesting and teaching reinforcing.

Finally, regarding the factors not related the use of the ICT tools, the present research confirms the findings of Sang et al. (2010) who also concluded that gender was not related to ICT use tools, while opposes the findings of Kisla et al., (2009) and Peeraer & Van Petegem (2010). In the sample, most participants were women which is usual in these faculties and if men proportion was larger, difference might have been emerged. Jegede (2009) concluded that the age does not influence the use of the ICT tools. On the contrary, Peeraer & Van Petegem (2010) and Drent & Meelissen (2008) found that the younger the tutors the more familiar they are with new technologies and their incorporation in their teaching. Some researchers (Demetriadis & Vlahavas, 2004; Kisla et al., 2009; Peeraer & Van Petegem, 2010) concluded that the educational staff who used the ICT tools more often come from faculties of pure and applied sciences and technologies, whereas the professors that had attended political and humanitarian sciences, i.e. more theoretical faculties, used less the ICT tools. This conclusion however seems not compatible to our findings, although nursing and physiotherapy incorporates to some extent elements of applied science. ICT tools may well facilitate any aspect of teaching, provided the instructor is properly trained and familiar with technology.

Conclusions

1. The educational staff of the Nursing and Physiotherapy departments of ATEITH often use the ICT tools. The ICT tools mostly used are the PC, the search engines, the internet, the e-mail, the Word, the electronic presentations, the projector and the web sites.
2. On average, the ICT tools are considered user's friendly. The tools easier to use were the same with those mostly used. Tools considered difficult to use were rarely implemented.

3. The ICT tools were quite easily incorporated into the educational process, while specific tools that were easier to be incorporated in educational process were used more often.

4. All ICT tools were considered useful in terms that they can contribute to the teaching process. The tools most frequently used were those thought as major contributors to the educational process.

5. Training, material and technical infrastructure, technical support and availability of time were the factors related to the ICT use.

Implications for future research

Based on the findings of the present research, educational staff believes that ICT tools substantially contribute to educational process. However, reasons behind ICT tools avoidance should be further investigated. The subjects maybe do not use the ICT tools because they doubt if these tools reinforce the educational process or because of the intervention of some psychological factors (such as ignorance, fear or insecurity) affect their perceptions. Future research should especially focus on certain ICT tools, like simulations, that in many studies appear to strengthen the teaching, but they are rarely used by the educational staff of the Nursing and Physiotherapy Departments of the A.T.E.I.TH.

References

- A.T.E.I. of Thessaloniki. (2010). Retrieval April 2012, from Network Administration Centre: <http://www.noc.teithe.gr/>
- Bond, C.S. & Procter, P.M. (2009). Prescription for nursing informatics in pre-registration nurse education. *Health Informatics Journal*, 15(1), 55-64.
- Cioffi, J. (2001). Clinical simulations: development and validation. *Nurse Education Today*, 21, 477-486.
- Corbett, N.A., Beveridge, P. & OESTREICH, S. J. (1980). Clinical Simulations in Nursing Practice. *American Journal of Nursing*, 80(4), 762-769.
- Demetriadis, S. & Vlahavas, I. (2004). Institutional efforts in tertiary education for promoting the integration of technology in instruction: a case study. *Proceedings of the 5th International Conference on Information & Communication Technologies in Education (ICICTE '04)* (pp. 457-462). Athens: National and Kapodistrian University of Athens.
- Drent, M. & Meelissen, M. (2008). Which factors obstruct or stimulate teacher educators to use ICT innovatively? *Computers & Education*, 51, pp. 187-199.
- European Commission. ICT for Education in Europe and the new EU2020 Strategy - Policy and Practice. available on 16.11.13 http://www.slideshare.net/eden_online/ict-for-education-in-europe-and-the-new-eu2020-strategy-policy-and-practice-part-2
- García-Valcárcel, A. & Tejedor, F. (2009). Training demands of the lecturers related to the use of ICT. *Proceedings of World Conference on Educational Sciences 2009 -Social and Behavioral Sciences-*. 1, 178-183. Elsevier Ltd.
- Halazonitis, A., Koumarios, D. & Apostolakis, I. (2008). E-learning: General regard and applied example from the speciality of X-ray Diagnosis. *Greek Medicine Records*, 25(6), 811-822.
- Hanna, D.R. (1991). Using Simulations to Teach Clinical Nursing. *Nurse Educator*, 16(2), 28-31.
- Jegede, P.O. (2009). Age and ICT-Related Behaviours of Higher Education Teachers in Nigeria. *Issues in Informing Science and Information Technology*, 6, 771-777.
- Jetté, S., Tribble, D.S.C., Gagnon, J. & Mathieu, L. (2010). Nursing students' perceptions of their resources toward the development of competencies in nursing informatics. *Nurse Education Today*, 30, 742-746.
- Johnson, J.H., Zerwic, J.J. & Theis, S.L. (1999). Clinical Simulation Laboratory: An Adjunct to Clinical Teaching. *Nurse Educator*, 24(5), 37-41.
- Kisla, T., Arikan, Y.D. & Sarsar, F. (2009). The investigation of the usage of ICT in university lecturers' courses. *Proceedings of World Conference on Educational Sciences 2009 - Social and Behavioral Sciences*. 1, 502-507. Elsevier Ltd.
- Lamond, D., Crow, R., Chase, J., Doggen, K. & Swinkels, M. (1996). Information sources used in decision making: considerations for simulation development. *Int. J. Nurs. Stud.*, 33(1), 47-57.
- Ministry of Education, Culture and Science. (2002). Ministry of Education, Culture and Science. *Ανάκτηση* December 2011, από Education on line: <http://www.minocw.nl/ict/publicaties.html>.
- Moule, P. (2003). ICT: a social justice approach to exploring user issues. *Nurse Bond, C. S., & Procter, P. M. (2009). Prescription for nursing informatics in pre-registration nurse education. Health Informatics Journal*, 15(1), 55-64.
- Peeraer, J. & Van Petegem, P. (2010). Factors Influencing Integration of ICT in Higher Education in Vietnam. *Proceedings of Global Learn Asia Pacific*, (pp. 916-924).

- Pfefferle, P.I., Van den Stock, E., Nauerth, A. & group, ".-I. a.-p. (2010). The LEONARDO-DA-VINCI pilot project "e-learning-assistant" – Situation-based learning in nursing education. *Nurse Education Today*, 30, 411-419.
- Reime, M. H., Harris, A. & Aksnes, J. (2008). The most successful method in teaching nursing students infection control – E-learning or lecture? *Nurse Education Today*, 28, 798-806.
- Ruthven, K., Hennessy, S. & Brindley, S. (2004) Teachers representations of the successful use of computer-based tools and resources in secondary English, mathematics and science, *Teaching and Teacher education*, 20(3), 259-275.
- Sang, G., Valcke, M., Van Braak, J. & Tondeur, J. (2010). Student teachers' thinking processes and ICT integration: Predictors of prospective teaching behaviors with educational technology. *Computers & Education*, 54, 103-112.
- Saranto, K. & Tallberg, M. (1998). Nursing informatics in nursing education: a challenge to nurse teachers. *Nurse Education Today*, 18, 79-87
- Smedley, A. (2005). The Importance of Informatics Competencies in Nursing. *CIN: Computers, Informatics, Nursing*, 23 (2), 106–110.
- Ten Brummelhuis, A.C. (2001). ICT-monitor 1999–2000, lerarenopleidingen [ICT-monitor 1999-2000 Teacher education]. Enschede: University of Twente.
- Van den Dool, P.C. (2003). Professional teaching personnel: Educating with the school, second evaluation of "educatief partnerschap".
- Ward, R. & Moule, P. (2007). Supporting pre-registration students in practice: A review of current ICT use. *Nurse Education Today*, 27, 60-67.
- White, J.E. (1995). Using Interactive Video to Add Physical Assessment Data to Computer-Based Patient Simulations in Nursing. *Computers in Nursing*, 13(5), 233-235.