Education in Computers Conquers Health Care Professional's 'Technophobia'

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Abstract

Although several studies in different countries have explored the extent to which health care professionals use biomedical technology as well as the computer and the internet, few researches are available on this subject in Greece. The potentially high rate of resistance to new technology has been summarized as "Technophobia" in the literature. The aim of this study was to explore and to overcome Technophobia barriers to new technology and promote the learning process training nurses to computer and internet. Two hundreds nurses of the main Hospitals of Western Greece, participated during last tree years, to a 2-month course, including basic computer skills that designed to assist the faculty in becoming comfortable computer users. The applications addressed included: introduction to windows, electronic mail, word processing, presentation and database applications, library on-line searches of literature databases and introduction to internet browsers. The participants completed a-16 item questionnaire before and after the course while SPSS 14.0 software was used for data analysis. The mean age for the participant nurses were 35.5 years. Overall, 32.6% of the entire sample could use the computer, 67.4% could not.Slightly more than two thirds (75 %) of the entire nurses had never used the internet, and 25 % had. The total improvement of new technology familiarization was statistically significant (usually $p<0.0001$). In conclusion clinical nurses in Greece have not fully utilised the opportunity that the use of computer and internet offer for nursing education. Improved efforts such as inclusion of more computer education courses in nursing curricular or in life long learning programs additionally with establishment of computer laboratories are required to increase the health care professional's access to computers and internet, conquering Technophobia and computer anxiety.

Keywords: Education, Informatics, nurse, Technophobia, Greece

1. Introduction

The use of technology, in particular for nurses, has to maintain the goal of client/patient focused care. Caring philosophy has been the trademark of nursing. As technology advances in health care it promises the chance for more direct patient care by shortening the length of time for documentation and access to pertinent data quickly. As computer systems develop to become more user friendly with bar codes, light pens, touch screen, handwriting and voice recognition applications the promise seems to be closer. Also security issues are being addressed in areas, such as, the armed forces and business. Certainly the systems developed there can be adapted for use in health care. Cost containment and legal protection in documentation are promised in computer usage, if that is truly realized, administrators will increase computers usage in health care. The constantly changing world of technology creates excitement and an obligation for faculty of nursing schools to address computer literacy in the curricula at all levels. Advances in telecommunication technology in the last two decades have led to the development of computer networks that allow access to vast amount of information and services [Barnard (2000)]. Of the many computer networks that have been developed, the most prominent and widespread is the Internet, a global network of networks that enables computers of all kinds to directly and transparently communicate throughout the world. This 'global network of networks' has been described as the 'Information Super-highway' or 'Infobahn' because it constitutes a shared global resource of knowledge, and means of collaboration and co-operation in diverse communities [Linderman (2000)]. It is an open and unregulated community of people who communicate freely across an international electronic computer network [Coiera (1995)]. It is simply the linking together of individual computers in a network [Mckenzie (1997)]. The Internet was originally conceived by the United States of America's military in the sixties, as a means of ensuring a workable communication system in the event of a strike by enemy missiles or forces [Deecember et al (1994)]. It has grown over the years to include academic and government computers as well as any one who owns a computer, a modem and an account with an Internet Service Provider. Although there is no precise statistics, it is estimated that there are at lest 100,000 networks, attached to more than 5 million computers located in over 100 countries, connected to the Internet. While access to the Internet was originally restricted to government departments, and organizations such as universities, in the 1990s it became available to those with access to a computer network, in both the developed and developing countries [Walmsley et al (2003)]. As in many other fields, the Internet is also present in medical domain. The development of the Internet, as a vehicle for World-wide communication, and the emergence of the World Wide Web, has made instantaneous

access to much of the entire body of medical information an exciting one [Jones et al (1991)]. It is now one of the most important sources of information for nurses in institutions of higher learning throughout the world. It has also become a popular medium for delivering educational materials. The Internet has been used for medical education in diverse ways including teaching of systems, diagnosis of diseases, and conduct of medical examinations [Mansor (2002), Mattheos et al (2002), Virtanen et al (2002), Odusanya et al (2002), Atack et al (2002), Grimes (2002)]. It is also being used as an important source of information for medical research [Hong et al (2002)]. Medical and nursing nurses who have participated in online education have stated that this mode of education has several advantages over traditional method of instruction. These advantages include the convenience of taking a course at a time that fitted nurses schedule and at a place that they did not have to commute to attend [Hayward et al (2002)]. Online learning also assists nurses with the practical application of theoretical knowledge of some aspects of medicine such as cardiology [Sear et al (1998)]. Despite these advantages, online learning has certain limitations. For example, some nurses have complained of insufficient time and limited computer access [Hayward et al (2002)]. Others claimed that this mode of instruction lack interactivity among nurses and between the nurses and the instructor that would be achieved in the ideal classroom setting. Internet teleconferencing, however, appears to offer for real-time interactive classroom meeting on the Internet [Ward et al (2001)]. In addition, visual learners were more apt than audio learners to gain from online learning. On-line learning has also been found to be consumer focused and many perceive online advertisement to be distracting [Sear et al (1998)]. Finally, the information available on the Internet can be overwhelming for nurses who lack the skills for verifying the quality of information available on-line [Nurjahan et al (2002)]. While several researches have explored the extent to which nurses use computer services in many countries, [Mansor et al (2002), Mattheos et al (2002)] no such studies are currently available in Greece. The aim of this study is to assess the level of computer and Internet use as well as biomedical technology confidence amongst Clinical Nurses in Western Greece.

2. Methods

2.1 The setting

The University Hospital and the hospital “Agios Andreas” of Patras in Western Greece have trained over 1,500 physicians and have produced approximately an equal number of scholarly publications of health-related researches. The hospitals have trained more than 5,000 nurses and midwives since inception and several hundred other health professionals including medical laboratory scientists, teachers of community health, environmental health, medical records and radiography. To date

over 3 million patients have received care in these hospitals. Continuing Education programs are organized every year form Hospital Education Offices including safety, research, clinical and informatics courses. The study population consists of nurses enrolled in the Hospitals during 2003 and 2006 academic Session.

2.2 Recruitment procedures

The nurses were recruited into the study during the routine life long learning educational program called "Basic Skills of Informatics" course (consisted of 50 hours training in a computer laboratory, lasting about 2 months) organized by the personnel educational service for the stuff of the institution. The applications addressed included: introduction to windows, electronic mail, word processing, presentation and database applications, library on-line searches of literature databases and introduction to internet browsers. Data were collected as part of efforts to assess the needs of nurses on use of computer and biomedical technology, which is a component of the services provided at their education. A questionnaire that consisted of 16 items was used for data collection. It elicited demographic profile, use of computer and biomedical technology resources. The questionnaire also assessed the nurses ' perceived self-efficacy to perform equipment related tasks, including ability to safely use instruments and search the Internet for classification of diseases. The questionnaire was pre-tested among a group of 20 nurses, and was revised to enhance its clarity and comprehension. Verbal informed consent was obtained from the nurses by disclosing that the data collected was for research purpose, that the questionnaire was anonymous, and that their participation in the study was voluntary. All of the 200 clinical nurses who showed up for the education program agreed to participate in the study (response rate 100%). The questionnaires were self-administered and collected shortly before and just after the program commenced. The data were entered into the computer and analysis was done using the SPSS 14.0 software.

3. Results

3.1 Demographic profile of participants

There are more female nurses (80 %) than males (18 %). The ages of the nurses ranged from 25–45 years; the mean age was 35.5 years. The 40 % of the sample had 5 to 15 years professional experience at the hospital. The clinical nurses that participated the study were from the main departments of the institution (i.e Pathology, Cardiology, Chirurgical, Orthopaedic department)

3.2 Use of the computer and Internet

Overall, only 42 % of the sample could use computers, and 60 % of them after the informatics course. Slightly more than two thirds (73 %) of the entire nurses had never used the internet, and 27 % had. After their education the numbers were 6 % and 94 %. Overall, the mean difference for the two groups (before and after the computer education program) was respectively significant ($p < 0.0001$) according to (non-parametric) *x-square* test results. The majority considered the PCs essential for their work (59 %) but with higher rate (78 %) after the course.

3.3 Use of the health care technology and safety

Overall, 32 % of the entire sample was comfortable to use a kind of biomedical equipment, 74 % was comfortable after the course. However, more nurses (24 %) had provided Electrocardiograms. Additionally 65 % of nurses claimed that they had never obtained safety or health-related instructions for any kind of equipment before the course and overall, the mean difference for the two groups (before and after the computer education program) was respectively significant ($p< 0,05$).

3.4 Perceived efficacy in performing technology-related tasks

The nurses were requested to determine the extent to which they perceived themselves confident in performing five technology-related tasks. A total of 67 % of nurses were "unconfident" to use any kind of equipment. While 73 % of the nurses were "unconfident" in accessing information from Internet, only 22 % of the nurses were “very confident” in performing this task. A total of 90 % of nurses considered the use of biomedical technology as “obstacle” in their relation with the patients. Overall, the mean difference for the two groups (before and after the computer education program) was respectively significant ($p < 0.0001$). When the level of confidence was compared with gender it was found that overall males slightly had superior mean scores than females. Nurses who are computer literate also had superior mean scores than those who are not.

Table 1. Questionnaire Results (partial)

Number	QUESTION	Before Info Course	After Info Course	P
1	**SEX**			
	WOMEN	82	84	> 0,05
	MEN	18	16	
2	**YEARS OF PREVIOUS EXPERIENCE**			
	<5	37	34	> 0,05
	5 until 15	40	40	
	15<	23	26	
3	**DEPARTMENT OF WORK**			
	PATHOLOGY	44	48	> 0,05
	CHIRURGICAL	22	22	
	CARDIOLOGY	25	12	
	ORTHOPAEDICS	9	18	
4	**LEVEL OF EDUCATION**			
	Univeristy	42	44	> 0,05
	Higher Education Institutions	45	50	
	Lower Education Institutions	13	6	
5	**KNOWLEDGE OF INTERNET USE**			
	KNOWLEDGE	27	94	**< 0,0001**
	IGNORANCE	73	6	
6	**FEELINGS USING A MEDICAL INSTRUMENT**			
	VERY UNCOMFORTABLE	39	18	**< 0,0001**
	UNCOMFORTABLE	1	2	
	INDIFFERENT	27	4	
	COMFORTABLE	1	2	
	VERY COMFORTABLE	22	54	
	SOMETHING ELSE	10	20	
7	**CONSIDERING OF THE KNOWLEDGE OF HANDLING INSTRUMENTS ESSENTIAL IN THEIR WORK**			
	BY NO MEANS	10	2	> 0,05
	LITTLE	8	16	
	VERY	82	82	
8	**WHICH INSTRUMENT IT WOULD BE USEFUL THEY KNOW THEY HANDLE**			
	ECG	24	18	**< 0,001**
	APINIDOTIS	19	17	
	COMPUTERS	42	60	
	PUMPS OF INFUSION	14	8	
	RADIOLOGICAL INSTRUMENT	1	2	

9	**CONSIDERING THE USE OF TECHNOLOGY OBSTACLE IN THEIR RELATION WITH THE PATIENT**			
	OBSTACLE	90	1	**< 0,0001**
	NOT OBSTACLE	7	94	
	I DO NOT KNOW	3	5	
10	**CONSIDERING THE PC IN THEIR WORK**			
	ESSENTIAL	59	78	> 0,05
	NOT ESSENTIAL	41	22	
11	**IF THEY KNOW THAT EXIST DANGERS FOR THEIR HEALTH FROM THE USE OF MEDICAL INSTRUMENTS**			
	THEY KNOW	35	62	**< 0,05**
	THEY DO NOT KNOW	65	38	
15	**IF CONSIDERING ESSENTIAL THEIR EDUCATION ON ISSUES SAFETY FROM THE MEDICAL TECHNOLOGY**			
	CONSIDERING ESSENTIAL THE EDUCATION	78	96	> 0,05
	DO NOT CONSIDERING ESSENTIAL THE EDUCATION	22	4	
16	**IF CONSIDERING ESSENTIAL THEIR EDUCATION ON ISSUES HANDLING OF SYSTEMS OF MEDICAL TECHNOLOGY**			
	CONSIDERING ESSENTIAL THE EDUCATION	66	92	> 0,05
	DO NOT CONSIDERING ESSENTIAL THE EDUCATION	34	8	

4. Related work

There have been rapid advances in communication and information technology, in the past few years and the pervasion of the World Wide Web into everyday life has important implications for medical education [Nurjahan (2002)]. The use of the computer and the Internet technology by health care professionals will result in more effective medical education, including teaching, medical examination, and diagnosis of disease [Mattheos et al (2002)]. However, these gains will only occur when health care have increased access to this technology. In this study, only 43% of the sample could use the computer. This figure is lower than the 84% of undergraduate nurses in Glasgow, United Kingdom (UK), 94% of medical students from Jeddah, Saudi Arabia and 95% undergraduate dental nurses in Oulu, Finland [Virtanen et al (2002)]. Similar studies have found higher proportion of nurses had used the computer: 61 % medical nurses from Malaysia, 80% final year medical students from Lagos. The relatively lower proportion of those who could use the computer in this study may be

a reflection of a limited access to computers among nurses in Greece. The relatively high cost of this product within the country is one of the primary reasons for this situation. Increased funding to Universities by government and Non-Governmental Agencies (NGA) is likely to solve this problem. This would enable Greek Nursing Departments to set-up computer laboratories in various faculties where nurses can have full access to Internet services as it is done in other countries including Australia [harris et al (2002)]. Although 42% of the entire sample in this study was computer literate, a larger majority (73 %) had not used the Internet. This figure is comparable to the findings from similar studies. In Malaysia, 67% of Medical students surveyed reported adequate skills in browsing the Internet 78% in using the e-mail [Nurjahan et al (2002)]. Similarly, in Lagos, the Internet and e-mail were used by 58% of medical nurses [Odusanya et al (2002)] and 53% dental students in the UK [Walmsley et al (2003)]. The difference between level of computer literacy and use of Internet services found in this study could be explained by the fact that the majority of those who used the Internet were assisted in doing so. More medical students, than student nurses had used both the computer and the Internet. In addition, more medical students than student nurses regularly obtained health-related information from the Internet. Similar findings have been reported in Glasgow where more medical students than nursing nurses had used the computer and the Internet. Other investigators have reported similar findings. In this survey, medical nurses may have had greater appreciation of the relevance of the Internet to their education since they have spent some part of their undergraduate years on the main campus of the University of Patras. Thus, many of them may have come to see the Internet as a valued source of information for their training. On the other hand, majority of the student nurses may not have had the opportunity to use the Internet since they have just recently left secondary school for the school of nursing. It is also possible that the importance of the Internet has not been emphasized in their previous and present education [Harris et al (2002), Kiekkas et al (2006)]. E-mail was the most popular of the Internet services used by the nurses. This is comparable to previous studies where e-mail use was high (78%) among medical nurses in Malaysia.

5. Conclusions

The use of the computer and Internet is rapidly becoming a key component of nurse education in many parts of the world [Buch (2002), Harris et al (2002)]. Additionally computer education helps nurses to feel more comfortable using biomedical technology [Barnard (2002)]. Although the Internet is an important source of medical information, nurses in Greece, have not fully utilized these facilities. The aim of this study was to explore and to overcome 'Technophobia' barriers to new technology and promote the learning process training nurses to computer and internet [Kiekkas et al

(2006)]. Two hundreds nurses of the main Hospitals of South-West Greece, participated during last three years, to a 2-month course, including basic computer skills that designed to assist the faculty in becoming comfortable computer users. In conclusion clinical nurses in Greece have not fully utilised the opportunity that the use of computer and internet offer for nursing assistance and education. Improved efforts such as inclusion of more computer education courses in nursing curricular or in life long learning programs additionally with establishment of computer laboratories are required to increase the health care professional's access to computers and internet, conquering 'Technophobia' and computer anxiety. Increased funding, introduction of computer education into existing nursing curricular would enhance nurses' ability to acquire, appraise, and use computer programs and information from the Internet to solve health problems quickly and efficiently during training and practice [Kiekkas et al (2006)].

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