Web-based Education against Computer Anxiety of Greek Health Care Professionals

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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. One hundred health care professionals of the main Hospitals of Western Greece, participated during last four years, to a web-based course, including basic computer skills that designed to assist the faculty in becoming comfortable computer users. The applications addressed included: introduction to MS 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. The mean age for the participants were 40.5 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 health care professionals had never used the internet, and 25 % had. The total improvement of new technology familiarization was statistically significant (usually p<0.0001). Improved efforts such as inclusion of more web-based courses in health care 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 computer anxiety.

Key-Words: - web-based education, computer anxiety, health care professionals

1 Introduction

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 health care 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 [1]. 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 [2]. It is an open and unregulated community of people who communicate freely across an international electronic computer network [3]. It is simply the linking together of individual computers in a network [4]. 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 [5]. 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 least 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 [6]. 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 [7]. 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 [8-12, 14]. It is also being used as an important source of information for medical research [12]. 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 [15]. Online learning also assists nurses with the practical application of theoretical knowledge of some aspects of medicine such as cardiology [16]. Despite these advantages, online learning has certain limitations. For example, some nurses have complained of insufficient time and limited computer access [15]. 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 [17]. 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 [16]. 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 [18]. While several researches have explored the extent to which nurses use computer services in many countries, [8], [9] 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 Health Care Professionals in Western Greece.

2 Materials and Methods

The University Hospital and the hospital “Agios Andreas” of Patras in Western Greece have trained over 1,600 physicians and have produced approximately an equal number of scholarly publications of health-related researches. The hospitals have trained more than 5,200 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 2005 and 2007 academic Session.

Fig. 1. User interface of the web-based education platform
Participants were recruited into the study during the routine life-long learning educational program called “Basic Skills of Informatics” course organized by the personnel educational service for the stuff of the institution. There have been used a web-based multimedia educational system named “INFOLAB” (Fig. 1). 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 architecture of the system is depicted in Figure 1. It comprises three main units: the Hypermedia Application, the Student Database and the Course Database. Students are the users of the system. A student has to identify himself before logging in to the system and can access application through a Web-browser. Then the Web Server (in fact IIS) is responsible for the interaction between the user and the system. The system is actually the tutoring part of the system. A student is able to study theory about various concepts and procedures related to Basic Skills of Informatics, look at a number of solved examples and try some exercises, to test his knowledge. All about examples and exercises are stored in the Database. So, there is an interaction between the Hypermedia Application and the Course database during a learning session. (Fig. 2). Data were collected as part of efforts to assess the needs of nurses on use of computer and biomedical technology resources. The questionnaire also assessed the participants’ 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 in hard-copy among a group of 20 participants, and was revised to enhance its clarity and comprehension. All of the 100 participants who showed up for the education program agreed to participate in the study (response rate 100%). The data were entered into the computer and analysis was done using the SPSS 15.0 software.

### Table 1. Questionnaire Results (partial)

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>Before Info Course</th>
<th>After Info Course</th>
<th>P</th>
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<tbody>
<tr>
<td>SEX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>women</td>
<td>82</td>
<td>84</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td>men</td>
<td>18</td>
<td>16</td>
<td></td>
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<tr>
<td>YEARS OF PREVIOUS EXPERIENCE</td>
<td></td>
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<td></td>
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<tr>
<td>&lt;5</td>
<td>37</td>
<td>34</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td>5 until 15</td>
<td>40</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>&gt; 15</td>
<td>23</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>DEPARTMENT OF WORK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pathology</td>
<td>44</td>
<td>48</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td>chirurgical</td>
<td>22</td>
<td>22</td>
<td></td>
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<tr>
<td>cardiology</td>
<td>25</td>
<td>12</td>
<td></td>
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<tr>
<td>orthopaedics</td>
<td>9</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>LEVEL OF EDUCATION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>42</td>
<td>44</td>
<td>&gt; 0.05</td>
</tr>
</tbody>
</table>
Higher Education Institutions: 45
Lower Education Institutions: 13

KNOWLEDGE OF INTERNET USE
knowledge: 27 94  < 0.0001
ignorance: 73 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

CONSIDERING THE KNOWLEDGE OF HANDLING INSTRUMENTS ESSENTIAL IN THEIR WORK
by no means: 10 2  > 0.05
little: 8 16
very: 82 82

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

CONSIDERING THE PC IN THEIR WORK
essential: 59 78  > 0.05
not essential: 41 22

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

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

3 Results

There are more females (80 %) than males (18 %). The ages of the nurses ranged from 25–45 years; the mean age was 40.5 years (Table 1). The 40 % of the sample had 10 to 20 years professional experience at the hospital. The Health Care Professionals that participated the study were from the main departments of the institution (i.e Pathology, Cardiology, Chirurgical, Intensive Care, Orthopaedic department). 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. 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 participants 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). The participants were requested to determine the extent to which they perceived themselves confident in performing five technology-related tasks. A total of 67 % of participants were "unconfident" to use any kind of equipment. While 73 % were "unconfident" in accessing information from Internet, only 22 % of the participants were “very confident” in performing this task. A total of 90 % of participants 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. Participants who are computer literate also had superior mean scores than those who are not.

4 Conclusion

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 [18]. 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 [9]. 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) [8], 94% of medical students from Jeddah, Saudi Arabia [9] and 95% undergraduate dental nurses in Oulu, Finland [11]. Similar studies have found higher proportion of nurses had used the computer: 61 % medical nurses from Malaysia [18],

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80% final year medical students from Lagos, Greece [12]. 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 Health Care Departments such as Nursing, Physiotherapy, Welfare, etc. 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 [21]. 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 [18]. Similarly, in Lagos, the Internet and e-mail were used by 58% of medical nurses [12] and 53% dental students in the UK [6]. 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 [8]. Other investigators have reported similar findings [8], [9]. 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. 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 [18]. The use of the computer and Internet is rapidly becoming a key component of nurse education in many parts of the world [20, 21]. Additionally computer education helps nurses to feel more comfortable using biomedical technology [1]. 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. 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 Health Care Professionals 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 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 [22].

References:
[8] Mansor I: Computer skills among medical nurses: a survey at the King Abdul Aziz


