Nursing undergraduates' technical competence in informatics*

A COMPETÊNCIA TÉCNICA EM INFORMÁTICA DE ALUNOS DE ENFERMAGEM

LA COMPETENCIA TECNICA EN INFORMÁTICA DE ESTUDIANTES DE ENFERMERÍA

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ABSTRACT

Nurses in the information age need to build their knowledge and abilities in order to be competent in this area. The objective of this study was to verify the knowledge of nursing freshmen (1st semester) and seniors (8th semester) registered in 2008 and 2007, respectively, regarding their ability to use informatics resources. This is a non-experimental, descriptive, exploratory survey. Data collection was performed using a questionnaire based on a set of competences in informatics. The results revealed a low rate of informatics knowledge among the freshmen. However, regarding the applications that students had the most difficulty to operate, between the two periods, seniors had the worst performance, which shows it is necessary to include computer classes in the preparation of these new professional, in order to prepare them for the work market.

DESCRIPTORS

Nursing informatics
Education, nursing
Educational technology

RESUMO

Os enfermeiros na era da informação precisam desenvolver seus conhecimentos e habilidades para que se tornem competentes nessa área. O objetivo deste estudo foi verificar o conhecimento dos alunos matriculados no primeiro e no oitavo semestres do curso de graduação em enfermagem dos anos de 2008 e 2007, respectivamente, no que se refere à utilização de recursos da informática. Trata-se de uma pesquisa não experimental do tipo estudo survey descritivo exploratório usado para a coleta dos dados em um questionário baseado em um conjunto de competências em informática. Os resultados mostraram o baixo índice de conhecimentos em informática dos alunos que estão ingressando no curso de graduação. Contudo, na comparação dos aplicativos que os alunos têm maior dificuldade, entre os dois períodos avaliados, a maior porcentagem foi de alunos do oitavo semestre, demonstrando a necessidade da introdução do uso do computador na formação desses novos profissionais para sua posterior adaptação ao mercado de trabalho.

DESCRITORES

Informática em enfermagem
Educação em enfermagem
Tecnologia educacional

RESUMEN

Los enfermeros en la era informática necesitan construir conocimientos y habilidades con el objeto de ser competentes en dicha área. Este estudio objetivó verificar el conocimiento de alumnos matriculados en primer y octavo semestres del curso de graduación en enfermería de los años 2008 y 2007, respectivamente, en referencia a utilización de recursos informáticos. Investigación no experimental del tipo estudio survey, descriptivo, exploratorio, utilizándose para recolección de datos un cuestionario basado en un conjunto de competencias en informática. Los resultados demostraron el bajo índice de conocimientos informáticos de los alumnos que están ingresando al curso de graduación. Así y todo, en la comparación de las aplicaciones en que los alumnos tienen mayor dificultad, entre ambos períodos, el mayor porcentaje fue de alumnos de octavo semestre, demostrándose la necesidad de introducción de uso del computador en la formación de los nuevos profesionales para su posterior adaptación al mercado laboral.

DESCRIPTORES

Informática aplicada a la enfermería
Educación en enfermería
Tecnología educacional

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INTRODUCTION

The current accelerated process of scientific and technologic modernization has generated new forms of knowledge construction and of establishing relationships with the working world. It is believed that in the upcoming years, the advancements in computer technology will cause a revolution across all levels of the nursing service processes in health institutions, providing operational and strategic advantages for the organization and for the development of professional practice.

Adopting a nursing culture that welcomes and uses information technology has been an important initiative to establish the educational competences and strategies required for Nursing informatics[1].

Nursing informatics is the specialist discipline that integrates Nursing, Computer, and information sciences to manage and communicate data, information and knowledge regarding nursing practice[2]. Nurses in the information era need to develop their knowledge and skills in order to be competent in this field.

The process of introducing the use of informatics in nursing has been rather slow, considering that the competences of the nursing team, in this field of knowledge, have been discussed in literature since the early 1980s[3].

Although informatics is a popular subject in literature, the media, and education there is evidence that nursing professionals still lack a clear understanding of how to use it in their professional practice[4]. It is believed that during their scientific and professional development, nursing professionals have few chances to develop the ability to formulate demands regarding Technology and Innovation in Health based on needs and other service issues[5].

Although informatics is a popular subject in literature, the media, and education there is evidence that nursing professionals still lack a clear understanding of how to use it in their professional practice.

Among the many taxonomies that describe informatics competences in Nursing, most address a three-category system, i.e., beginner, intermediate, and advanced levels. For each category, competences are established according to complexity levels: technique, utilities, and leadership[2,6].

The technical competences (beginner level) are related to the psychomotor skills used to operate the computer and its peripheral devices (printer, CD-ROM, DVD, webcam). They include the ability to use any software and basic applications, such as word processors, presentation software, databases, the Word Wide Web, and e-mail programs. The utility competences (intermediate level) are those related to the process of using computers and other technological equipment in health care, education and nursing management. Leadership competences (advanced level) refer to the ethical and managerial aspects of using computers and other technological equipment in nursing practice[2,6].

Today, informatics competence has become a basic and essential requirement for nurses to perform their duty effectively[7]. Therefore, verifying the informatics competence of nursing undergraduates is an important issue in order to advance in the profession, as it will reveal the educational needs in this field with the purpose of preparing students for the work market.

Considering this context, the following questions emerged: What informatics knowledge did nursing undergraduates have when they entered the course? What deficiencies do future health professionals find to use a computer?

OBJETIVE

To verify the skills and technical competencies that nursing freshmen (1st semester) and seniors (8th semester) of a public university have in using informatics.

METHOD

This non-experimental, descriptive-exploratory survey was performed at a public higher education institution located in Ribeirão Preto, São Paulo. The study population consisted of 155 nursing undergraduates regularly registered in the 1st (freshmen) and 8th (seniors) semesters in the years 2008 and 2007, respectively. The inclusion criteria were the students' accessibility and their consent to participate. The sample consisted of 116 subjects (74.8% of the study population), 54 freshmen and 62 seniors.

The data were collected from September to November 2007 and from February to April 2008, using a questionnaire based on a set of basic informatics competencies required in the nursing course. The questionnaire contained open and closed questions, and was divided into two parts: demographics, and the knowledge and use of informatics applications.

The closed questions were tabulated according to frequency, while open questions were categorized into common themes.

After being approved by the Research Ethics Committee of the studied institution (Protocol number 0565/2005), the study subjects were contacted and informed about the study objectives and their right to refuse to participate or, in case agreeing at first, to later withdraw from the study. In compliance with resolution 196-96 of the National Health Council[8], data collection was performed only after the subjects provided written consent.

RESULTS

Of the 54 freshmen of year 2008, 90.74% were female, of age between 18 and 24 years. Regarding the year 2007 senior students, most (95.16%) were female, and the predominant age group was between 21 and 29 years (98.38%).

Table 1 lists the areas of informatics knowledge reported by the 2008 freshmen regarding the question *what informatics applications are you skilled at?*

Table 1 – Nursing freshman students' (year 2008) knowledge on informatics applications - Ribeirão Preto - 2011

Use of Informatics Applications*	N	%
Text editor	21	38.8
Internet	54	100
Power Point®	8	14.8
Windows®	12	22.2
Spreadsheet (Excel®)	5	9.2

* Study subjects reported more than one application
Note: (n=54)

It was observed that all (100%) freshmen students of the nursing course have basic knowledge in Internet use. It is also emphasized that many are skilled in using the *Word®* text editor (38.8%). Other MS-Office® and Windows® software obtained a lower use rate or were not reported by the students.

Table 2 shows the applications that students from both groups had more difficulty to manage. It refers to the question *what are the informatics applications that you face more difficulties to use?*

Table 2 – Freshman (year 2008) and senior (2007) nursing students' difficulties to use informatics applications - Ribeirão Preto - 2011

Difficulties to use Informatics Applications*	1st semester (2008)		8th semester (2007)	
	N	%	N	%
Eletronic Spreadsheet (Excel®)	4	62.9	45	72.6
Power Point®	19	35.2	8	12.9
Database	2	96.3	46	74.2
Windows®	7	12.9	4	6.4
All applications	0	37.0	6	9.6

* Study subjects reported more than one application
Note: (n=54) and (n=62)

According to Table 2, it is observed that both groups of students experience similar difficulties to use the reported applications. However, the difficulty with Excel (72.6%) is more frequent among senior students. It is noticed, nonetheless, that the undergraduates' acquire informatics knowledge throughout the course, because while 37% of the freshmen referring experiencing difficulties in all applications compared to only 9.6% of the seniors.

Table 3 presents the knowledge that senior students acquired throughout the graduation course. It refers to the question *as a nursing student in the 8th semester, do you think the course helped you acquire new knowledge in informatics?*

Table 3 – Informatics knowledge acquired by senior students (8th semester, year 2007) throughout the nursing graduation course - Ribeirão Preto - 2011

Informatics knowledge acquired throughout the graduation course*	N	%
Power Point®	30	48.4
Internet	12	19.3
Fatabase - Access®	19	30.6
Text editor - Word®	8	12.9
Electronic spreadsheet - Excel®	18	29.0
Self-learning	8	12.9
None	19	30.6

* Study subjects reported more than one application. Note: (n=62)

It is observed in Table 3 that, in fact, there was knowledge acquisition throughout the graduation course. Among the applications reported by the subjects, the presentation (Power Point®), databank manager (Access®) and electronic spreadsheet (Excel®) software were those with the greatest learning impact throughout the graduation course.

Regarding the open questions *Where do you most frequently use the computer?* and *What internet resources do you use?*, it was found that the Informatics Room at the studied education institution is the place that the subjects most use (94.3%), followed by their home (38.8%). Among the Internet resources, the most used were e-mails, social networking (*Orkut®*), search website (*Google®*) and instant messaging software (MSN *messenger®*), reported by 86.2% of all surveyed students. The students also reported that, when needed, they accessed national databases and specific knowledge websites to develop research and academic activities.

DISCUSSION

By the present study results, it is identified that students have a need for informatics knowledge and skills. Despite the fact that the majority of students from both groups reported being able to use the word processor and internet, their competences are ranked as a beginner level[2,5]. These results are similar to those found in other studies performed with nursing students from public universities in Brazil[9-10].

Article 5 of the National Curricular Guidelines for Nursing Graduation Courses states that nursing education should include teaching nurses the necessary knowledge required to use new information and communication technologies[10]. Although in the present study there is evidence of learning experiences related to informatics knowledge, it is limited. It is understood that it is necessary to reinforce basic informatics competences and in-

clude theses contents in formal Nursing curricula in order to improve the future nurses' competence in managing information and using informatics in health institutions[6,12]. Nursing informatics therefore challenges the faculty to produce nurses who are prepared to use information technology to improve the patient care process and change health care[3].

Many nursing schools offer informatics knowledge to their students. However, it should not me limited to mastering resources such as the Internet, databanks, electronic spreadsheets and word editors, as observed in the present study. Rather, schools should develop the future professionals' skills and competences to work efficiently in an environment that has been growing more and more dependent on information technology in order to promote patient safety[3,12-13].

Throughout graduation, students learn to use applications for presentations (Power Point®), databank management (Access®), electronic spreadsheets (Excel®) and the Internet because it is a requirement for developing the End-of-Course Essay. Nevertheless, the influence of extracurricular activities such as scientific initiation, work fellowships and activities associated with their class disciplines should also be considered. The computer is a necessary tool for performing academic activities[14-15].

Evidently, there is a need to integrate informatics to the educational process, with a view to improve the construction of new knowledge. However, considering the reality of Nursing education, few changes have been made in this direction and advancements have occurred due to individual initiatives[15].

In this context, some studies call attention to the fact that including informatics in education is a process that should not be done alone: rather, it should be integrated with other class disciplines in order to allow students to learn the potentialities of using this resource throughout their professional development[16-17].

CONCLUSION

The present study permitted to verify the knowledge that nursing freshmen (1st semester) and seniors (8th semester) have regarding informatics resources and their use. The findings will help develop a new thought about this area of knowledge and define strategies to solve the identified deficiencies.

Although the results were limited, they point at the need to intensify the teaching of informatics in Nursing graduation, with a view to allow students to be challenged towards reflecting about and experimenting with information technology in health care, education, management, and research, with a view to develop a new conception of informatics adherent to professional practice.

It is important to prepare nurses with skills and knowledge about nursing and informatics. Therefore, we defend creating class disciplines that incorporate the necessary foundation to familiarize students with Nursing informatics and encourage them to think critically about computer use in the different areas.

One alternative already implemented in the studied institution was having informatics monitors manage the students' computer room with a view to providing them with the necessary help while developing academic activities. However, the care that these professionals provide is often unsatisfactory, because of their limited technical competence to solve the questions related to operating the most commonly used applications. This lack of skill is even more expressive in providing orientations in literature searches using health databanks.

Considering this context, the strategy for change consists of adopting a pedagogical project that incorporates Information and Technology Contents (ITC) in Nursing as a basic and essential knowledge in the students' development. Without this education, future nurses will not be able to understand that the field of Nursing informatics involves not only knowledge and competence, but also a reflection regarding contemporary nursing and the implied responsibilities in managing health information.

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