The Applicability of Information Technology and the Communication in Nursing Undergraduate Education

ORIGINAL

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Abstract

Objective: To understand the use of information and communication technology (ICT) as a pedagogical resource for teaching-learning process in nursing through the discourses of professors, and to identify the types of technology used as a tool to strengthen the teaching-learning process.

Method: Exploratory descriptive and qualitative study, guided by Grounded Theory; the sample consisted of twelve professors of nursing; data collection was conducted between February and May 2013, through the interview technique; the analysis was developed simultaneously with the collection, allowing the formation of categories and subcategories.

Results: The nursing faculty expressed the knowledge dimension of ICT experienced in practice, recognizing it as an aid in the theoretical-practical activities. Conclusion: this technology should be further studied and explored in healthcare and, more specifically, in the training of nurses.

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Introduction

The published literature on the use of the Internet for academic communities appears since the 1980s. In one of the first reports, it was argued that electronic networks exerted little influence on scientific communication because few teachers were users of networks. However, after a few years, the intensive use of the Internet has been

reported as a strong influence in the scientific community, especially the e-mail and the web [1].

In this perspective, through the Law of Guidelines and Bases of National Education - LDB Brazil is in line with the principles of the world declaration on higher education, providing greater autonomy and academic freedom, challenging educators to use new technologies, adopting new pedagogical proposals and curricula being more flexible to meet different demands. All this, aiming at the training of responsible, critical citizens and able to work in social changes [2].

In this process of integration of technology in education, among the most used technological products by contemporary individuals is undoubtedly the computer. It comes as the maximum icon of this technological process because, among its many uses, it points to the speed of processing information, and the ability in communication [1].

Information technology is characterized by the transmission of data through the electronic devices. In the meantime, the Internet offers a powerful feature that is communication with the reduction of distances, allowing researchers being interconnected in education, exchanging knowledge and facilitating the location of collections from various fields of knowledge [3].

However, the use of these technologies causes intense discussions among educators since they offer new possibilities to learn, by integrating various languages and resources, making a simple internet tool to assist in the learning center of a new way of learning. Certainly, this causes changes in the modes of communication and interaction [3].

The teaching articulated by a computer allows using the internet facility to store, retrieve and search for information that can support the development of academic work. On the other hand, some time ago, the first pioneers students of master course in nursing in the country, established in School Nursing Anna Nery of the Federal University of Rio de Janeiro in 1972, had as resource material available

in a typewriter, quite limited and deficient, which hinder the learning process [4].

Today, the use of technology in the education of nursing process in Brazil is already approved in the National Curriculum Guidelines for Undergraduate courses in Nursing. The benefits occur when using with an appropriate field of Information, and Communication Technologies (ICT) promotes the Nursing teaching [5].

Ordinance Number 4059 of the Ministry of Education, conjecture that higher education institutions may introduce in the curriculum of their recognized higher education courses, subjects using blended learning mode, with a maximum of 20% of the total hours of the course, with face-to-face assessments [5].

Considering the internet as a very important tool for nursing professors, because in the world of information technology, the educational process is inserted into the reality of university education, it (the Internet) has become a pedagogical support vehicle to assist in of the teaching and learning process.

Thus, under this assumption, the problem that motivated this study, which began with a Master´s thesis, sought answers to the following questions: What do nursing professors think on the use of information and communication technologies as didactic and teaching resource to the teaching-learning activities?

Thus, given the issues addressed, the objectives of this study are: To understand, through the speeches of professors, the use of information and communication technology as a teaching and pedagogical resource for teaching-learning process in nursing and identify which technology is used as a resource to strengthen the teaching-learning process.

Method

This is an exploratory and descriptive study with a qualitative approach, guided by the Grounded Theory (GT). For a better understanding of the phe-

nomenon investigated, it was chosen the qualitative approach in trying to understand how is the use of information and communication technologies in the teaching-learning process from the speeches of professors.

GT is a method for theory construction based on data investigated in certain reality that from the analysis of the data can get to an explanation of the phenomenon investigated [6].

Through a comparative process of the analysis, this method search from the data a theory or emerging concept. The data collection and analysis took place between February and May 2013, simultaneously until data saturation, at which the researcher cannot formulate new categories. The methodology consists of a few steps: starting with the collection and coding of data, theoretical sampling, preparation of memoranda and formulating the central categories.

This research was developed at the Federal University of Paraíba (UFPB), on the campus of the Health Sciences Center of João Pessoa-PB, Brazil. The graduate faculty of the nursing course participated in this study. Thus, the sample inclusion criteria were nursing professors who work in the federal institution and to agree and had availability to contribute to the study.

The number of professors who participated in the study was not initially established, since the GT approach method does not adopt a statistical sample, the amount of subjects in this reference frame is determined by theoretical saturation. Thus, as the data were being collected, they were concurrently subjected to analysis, aimed at theoretical saturation. This saturation of the sample was reached after the completion of the 12th interview.

The data saturation criterion allows convergences and divergences of the information collected leading to repetition of the content of the speeches, satisfying the researcher [7]. A semi-structured interview technique was used, with guiding questions relating to the proposed objectives: How do you perceive the behavior of nursing professors using ICT in the activities as a teaching and pedagogical resource for teaching and learning activities? What are the ICT that you use as a resource to strengthen the teaching-learning process?

Throughout the development phase of the method, memos were drafted, which are records or notes related to the process. Data analysis took place through three steps: open coding, axial coding, and selective coding. The review process was to conceptualize the data collected, which initially constituted on preliminary codes, passing the conceptual codes and then the categories that converged in phenomena [6].

The Research Ethics Committee of the Health Sciences Center under CAAE No 11625313.5.0000.5188 approved the study. Participants were informed about the purpose of the study by signing the Informed Consent Form, as established by Resolution 466/2012 of the National Health Council - CNS, which regulates research involving human beings. It was emphasized the guarantee of confidentiality, voluntary participation, not prejudices by not participating in the study or time of quitting. The survey did not offer predictable health risks [8].

Results

The analysis and discussion of the results of this study enable an understanding of the experiences of professors from the phenomenon of identification that received the following name: Using ICT in Teaching Nursing. This phenomenon shows the experience of professors in the teaching-learning process.

Figure 1 shows the diagram of the phenomenon within the paradigmatic model of Grounded Theory (GT).

The categories were named and inserted into the paradigmatic model of the GT. In this model, there are six components that are called: phenomenon, which is the category that appoints the

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Figure 1: Theoretical model of the phenomenon - using the Information and Communication Technology in nursing education. João Pessoa-Paraíba, 2013.
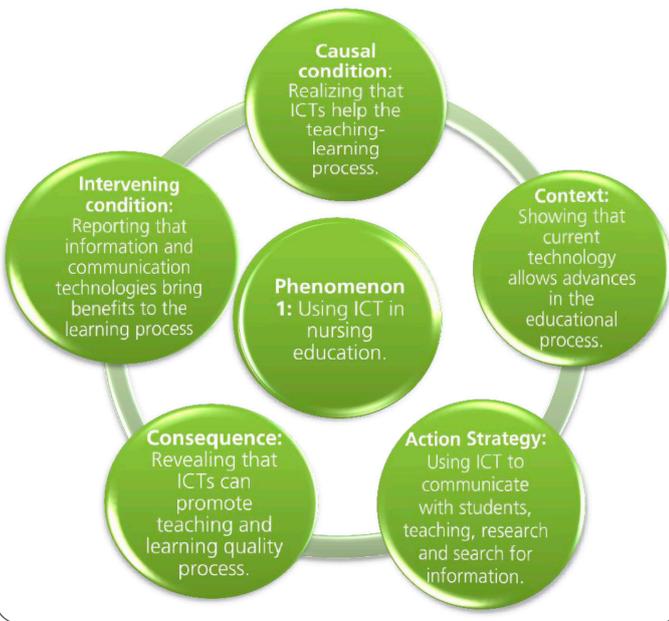
study and covers all categories, the found phenomenon, "Using ICT in teaching Nursing." The second element is the causal condition, which was called "Realizing that ICTs help in the teaching-learning process." The third component is the context of the research, called "Demonstrating that current technology allows advances in the educational process." The fourth element is the intervening condition named "reporting the Information and Communication Technologies are beneficial to the learning process". The fifth element is the action strategy, which had the category "Using ICT to communicate with students, teaching, in research and search for information" and finally the result, which was named "Revealing that ICTs can promote a quality teaching-learning process." All categories and testimonials of the study professors are shown below.

Causal condition. Realizing that ICTs aid the teaching-learning process.

It is considered a causal condition because it arises from the vision of professors to realize that ICTs

provide the teaching-learning process using tools and means facilitating the understanding of the students. This can occur either in the classroom, as elsewhere through technological tools that promote a more updated and wide training. It can be seen in the reports of teachers below:

> [...] Today everything works by the media, the media resources, the internet. Today we have classes by video conference where you can communicate with people around the world.
>
> P.1.

> [...] Several colleges offer materials on sites worldwide, like the Unicamp and USP. Knowledge must be shared so there is a growth act, and often that knowledge can be shared free of charge and without leaving home.
>
> P.6.

The advantage that the use of the internet can bring in the academic life of both students and teachers can be seen in the following reports:

> [...] I do not have an available network in the room, I am directing a student and need to show content that found on a given site, have to submit the site to them, for them to do the search.
>
> P.1.

> [...] And I'm open to contributing to the students when the student needs, they tell me that they were invited to teach a class, I make the available material, I'll help!
>
> P.6.

Showing context. Demonstrating that current technology allows advances in the educational process

The use of computer technology enables to perform more creative processes, providing opportunities for more active learning to students of the undergraduate course in nursing. The following are some testimonials from professors:

[...] I use the internet also in the research, nowadays students easily have access to the database, virtual library in health, CAPES portal, SCIELO, LILACS.

P.10.

[...] While communication technology, I use the internet as the information exchange strategy with students.

P.4.

Highlighting the intervening condition. Reporting the Information and Communication Technologies are beneficial to the learning process

The Moodle system is an innovative resource that can contribute to the educational process.

[...] The Moodle system is fantastic because it has many possibilities, many features that you can exchange with the student and interact not only with a student but with the group, both to put stuff on the environment for students to have access, like having virtual classes in forums system, debates in which people put their perceptions, interpretations, in which students ask questions, teachers answered.

P.7.

Distance education as a tool for teaching nursing is of great value, because in the virtual environment, new ways to disseminate learning. The professor as a mediator must be prepared and train students for this rich and innovative world knowledge.

Developing the action strategy. Using ICT to communicate with students, teaching, research and to search information

ICT can provide growth in the teaching career, through bold and incentives strategies that optimize the teaching process, as noted in the sub-categories: Using e-mail as the main technological tool and using the resources of ICT: videos, database, ima-

ges, links, social networking, Prezi, conceptual map in the teaching-learning process. In the statements below, professors comment the most used features:

[...] A tool we have used is the internet, plus the email specifically to send material, subject menu, sending information.

P.1.

[...] Mainly, the activities carried by the internet via Youtube through the databases, particularly databases that support texts that students can research in a cheap and affordable way; via e-mail, to exchange immediate information.

P.3.

Identifying the consequences of the phenomenon. Revealing that ICTs can promote a quality teaching-learning process

Virtual education offers various possibilities for students and teachers so that the teacher can individually analyze the knowledge of each student and can motivate more and more critical and reflective thinking of each student. It can be seen in the following statements:

[...] In distance learning, we have the participation of students, and the quality is maintained as a classroom teaching, it is called the student's participation in discussions in the forums, development activities, we have a schedule to meet, so I understand that distance learning has its quality.

P.11.

[...] It could have this virtual supplement that is very interesting, which can remedy doubt that the student is taking the reading of a text, the discussion of an issue in a case study so he could take this doubt more quickly with the teacher.

P.7.

Discussion

Causal condition. Realizing that ICTs aid the teaching-learning process

In this category, we found three interactions combined by subcategories: Revealing that ICT facilitates free access to knowledge worldwide; understanding the importance of the internet to expand the classroom to facilitate the teaching of students; acknowledging the approval of the students with the insertion of virtual education and increased the interactivity of the learning process.

In the subcategory "Revealing that ICT facilitates free access to knowledge worldwide", professors of the researched educational institution recognize that the use of ICT facilitates access to global knowledge for free, allowing students to broaden their worldviews through obtaining information and materials stemmed from several places, as can be seen in the testimonies of professors P.1 and P.6.

The information society has different contours in the face of the explosion of available information. The individual is taken to develop a critical awareness of what is being presented, examining the relevance of this to their needs, to take proactive stances search and use of information and to establish relationships between information processed, to then produce their knowledge [9].

In sub-categories: understanding the importance of the internet to expand the classroom to facilitate the teaching of students and recognizing the approval of the students with the insertion of virtual education and increased the interactivity of the learning process.

It is noticed that the institution where it was conducted this study, does not have yet accessible internet in the classroom, which makes the education modernization process difficult. The presence of ICT in the lives of students and teachers is a healthy reality. However, not having the Internet resources in the classroom creates an uncomfortable limitation, resulting in a possible disadvantage in the teaching-learning process, considering the dynamics of important content to the successful development of the class, as can be seen in the statements of professors P.1 and P.6.

Study with professors in a private university in the south of São Paulo regarding ICT on the use of wireless in the institution showed that 14 (51.9%) use it and 13 (48.1%) do not. In their homes, there was an increase to 17 (63.0%) who use this type of network. There were 77.8% access rate reported using the Internet at least once a day; 14.8% use it four to five times per week, and 7.4% use it two to three times per week. This shows that there are little infrastructure and material resources in universities, whether public or private, for the use of the Internet in the educational institution and within the classroom environment [9].

In Brazil, the teaching of Nursing has several experiments using and producing software for self-taught students with positive and promising results. The configuration of the software provides the essential conditions for teaching and pedagogical training of teachers and students, initiating the construction of a generation of researchers in nursing trained from a technological education, in addition to these instrumentalize software and enable them to develop practical activities such as the preparation and administration of drugs [10].

The main example of using the Distance Learning (DL) in Graduate Nursing is the use of virtual environments that support the learning process, but the inclusion of Nursing in DL is still incipient, requiring teacher training and infrastructure investment [10].

The fact is that the insertion of a new modality and teaching practice in nursing with the presence of ICT brought teachers and students closer and new ways of building knowledge, making the student a person more active in this process and more approaching of the teachers.

Showing context. Demonstrating that current technology allows advances in the educational process

ICTs are the vehicle for transmission, dissemination, processing and creation of content that may or may not be associated with educational technology. They are present in many areas of human life, bringing numerous benefits regarding the implementation and operation of the main activities and processes performed by human beings. Once there was the spread of Internet use, several areas have sought to take advantage of these benefits, making the information becomes available [10].

In recent years, ICT is emerging educational reforms as a teaching resource in university courses, particularly in nursing, also being used as a tool for the organization, management, and educational administration and/or scientific research tool. This new scenario requires adaptation effort by nursing teachers, in improving new skills to keep up with the advances in ICT, and then, they can form health professionals with the ability to develop a critical analysis of the teaching-learning process [11].

The sub-categories that emerged from the phenomenon of context are: Reporting is currently easier access to journals due to the advancement of technology and showing that the advancement of technology allows communication and interaction with the world of information facilitating learning.

According to the reports of professors P.10 and P.4, the use of ICT in education is a good option when becoming a productive alternative teaching, when enabling the student to rewrite the information, experience and apply, recreate possibilities and even invent, produce and express knowledge involving intense process of production, combined with significant efforts.

In a systematic review of research literature, several banks of important data were used for the scientific framework of the study and the databases used were: Virtual Health Library: LILACS (Latin American and Caribbean Health Sciences), SCIELO (Scientific Electronic Library Online) and BDENF (Nursing Database). This shows that every scientific study by research grounded in databases enables the achievement of important information that can contribute to the teaching and learning development in the area. [10]

Technological possibilities play a role of intellectual technology, that is they reorganize in one way or another, the world view of users, modifying their mental reflexes, leads the individual to evolve, to improve, to recreate and to produce. New skills appear, in addition to online information support and help nursing students to have a clinical decision-making faster because of the easy access. Because of this, the internet has become a source of information that has grown in recent years by nursing students [12].

Highlighting the intervening condition. Reporting the Information and Communication Technologies are beneficial to the learning process

The virtual tools that have achieved education should be incorporated with well-established and transformer objectives, and not just as a different way of transmitting knowledge. It should be noted that these technologies are not yet close to the focus and the reality that is seen in the subjects of the course of Undergraduate Nursing. However, it is important to note that shortly, they should be integrated into the training of nurses, for example, the simulation in the virtual environment [9].

The nursing faculty see ICT as a tool that brings benefits and helps in teaching and student learning process, as well as facilitating and streamlining the process, as seen in the following sub-categories: Recognizing the benefits of ICT in teaching and learning; Considering the nursing coordination should implement the use of ICT and sensitize teachers to use the Moodle system.

Professors reported several benefits that ICTs can bring to nursing education, such as increased student-teacher interaction, reduce distances, increase attention student skills in the classroom, student transformation into an active human being in the education process, among others.

In the report of P.7, is seen that the virtual environment becomes a promising and effective reality for teachers and students, it is a favorable ground for the growth and development in the pursuit of knowledge. Nevertheless, the nursing course is mostly in the classroom, regarding the approach to teaching tools embedded in ICT. Again, it is reiterated that the technology provides ease to get free and fast knowledge, and can create new understandings that can stimulate critical thinking in the face of existing information.

Moodle is a platform developed by free software, which can be applied in nursing subjects by allowing interaction, participation, and cooperation of the students to the construction of knowledge, allowing collaborative learning. It can contribute to the widespread use of ICT in education because of the flexibility and low cost of deployment and use. This virtual learning environment enables the availability of themes and materials to support the development in the classroom and to carry out the activities of virtual classes [1].

It is positive that professors report that the virtual learning environment can contribute to the training of nursing students, show even that through this means they can apply new forms of assessment, from the interaction and communication with the student in the forums and educational chats, thus changing the traditional application of evidence that cannot truly measure the student's knowledge.

Developing the action strategy. Using ICT to communicate with students, teaching, research and search for information

The use of digital technologies brings new responsibilities to nursing teachers who, by appropriating these tools, feel challenged to learn not only the technical aspects but also to adapt them to nursing education needs. With the use of ICT, there is the opportunity for a different interaction between teacher and student in the classroom teaching practices [13].

The use of these resources that the internet provided changed the way of communication and interaction of people, especially in the academic area, with the acquisition of socialization benefits. For instance, there is a closer relationship between teachers and students, increasing a quick interaction with the students and with low financial cost.

The integration of ICT in teaching and learning nursing, as noted in the reports of P.1 and P.3, allows a break from the traditional way of teaching. The teachers who use technology to facilitate students´ understanding and grasp their attention in the classroom makes information sharing something more creative and less "stressful", since only textual classes, no image, sound or dynamic may discourage students, hindering to spend hours just listening to the teacher's voice.

In a survey conducted in a private university in the south of São Paulo on the use of ICT resources, teachers use to share the contents used in the subjects they teach by email, 18 (66.7%), 7 (25.9%) reported leaving the printed material with the room representative and 2 (7.4%) leave the copies of the institution sector. All of the participants reported being responsible for preparing the materials for their classes. This result is to confirm that nursing teachers use e-mail as a most common ICT feature [9].

For the monitoring of new methods of education with existing technologies, teachers/nurses have researched and developed distance learning courses, websites, educational software and virtual learning environments. The search for knowledge to improve nursing care in health services should be a routi-

ne. Joining the new educational technologies collaborate, relevantly to the continuing education of professionals. Numerous issues and adverse events related to care could be learned and discussed in virtual environments [14].

ICTs improve nursing education as well as patient care. Through the information on the internet, students can ask or seek knowledge about diseases that are uncommon. ICT is being embedded not only in the virtual distance learning but also in the classroom mode when the simple preparation of a collective email is a different resource and stimulating better education.

Identifying the consequences of the phenomenon. Revealing that ICTs can promote a quality teaching-learning process

A survey at a public university in João Pessoa-PB, which aimed to investigate the relationship between the Internet and the teaching-learning process of nursing students, found in the discourse of students that the use of the internet contributes to academic research, for information and updating of knowledge, and approach the teacher with the student, narrowing the gap and facilitating communication and obtaining world information to academic research. [15] The nursing faculty must enter this new academic reality, for updating their knowledge causes personal and professional development that will help in the training of nurses prepared for the labor market that requires technological skills.

Nursing professors recognize the benefits that ICT provides to the teaching-learning process, according to the following subcategories: Revealing the quality of virtual education (distance) remains equally to the classroom course and reporting that learning distance is a breakthrough that brings benefits for students and teachers.

The tool of ICT that enables virtual teaching was the Moodle, a feature that maintains the quality of education, requiring more knowledge and critical thinking of students to participate in forums, chat rooms, and various activities. This shows that if used correctly, that is, encouraging students to reflect critically, virtual education can be used to assist in the teaching-learning process of nursing.

According to reports of P.11 eP.7, it can be said that the presence of computer resources in education favors education, providing access to discussion groups such as forums, and other online resources that can contribute to facilitating the application of new knowledge and thus improving learning, by a digital space characterized as stimulatory and enriching for academic qualification [12].

Also, the teacher has to growth, knowledge of a new type of education, ease of preparation and search for materials to teach their classes and also in virtual times. Thus, the Internet and its technological resources are present and are used daily by teachers, contributing in the form of teaching and understanding of students.

In a study conducted at the University of São Paulo School of Nursing, the use of mix learning in academic education of nursing students presented a challenge for students and tutors and, for them, conducting virtual classes generated new challenges in their practices teaching. The involvement of students in virtual activities exceeded the expectations of tutors when compared to the traditional model of classroom lessons. The presence of the tutor and the link established contributed to the development of the students through the activities of which have proven committed to their learning and the search for improvement of their knowledge [1].

These technologies face some difficulties in implementation due to the interaction of issues involving the computer and the human being. A study in a Spanish college indicates low adoption by professors older than 40 years old, compared to younger people who are a generation of digital natives. The

teachers also do not realize that the application of ICT allows more time for development of their work in teaching and research. [12]

Final Considerations

It is possible to understand the perception of the university professors studied about their experience with ICTs considering the social, political and organizational institution. The study was able to achieve the proposed objectives, exposing the perceptions of nursing teachers on the use of ICT resources, showing that some teachers used more intensively tools, intending to improve and apply in their practices and other teachers do not use for insecurity, fear or due to lack of knowledge about the resources that ICT can offer to the learning.

It was found that the most commonly used technologies are resources available on the Internet, such as e-mail, the primary means of communication and exchange of information/materials between teachers and students, in addition to educational videos, database usage, images and sounds to boost exposure lecture, the Moodle platform, used by some teachers and the skills mannequins in the practice.

One aspect highlighted in this study about the knowledge of teachers on ICT is their little use in daily practice. In most speeches, professors reported using existing technologies at the university only in lectures, through multimedia features such as data show, laptop.

Moodle recently available by the university allows some teachers use it in their subjects, but still a bit away from the educational reality available on the technological market. Nevertheless, all study participants use some ICT resource in the process of teaching and learning, reaffirming the role of technology in the university educational process.

Another important aspect of the study is the fact that, in the nursing field there are few study groups or teachers who work with ICT. It is necessary more research in this area of information and communication technology that may have applicability not only to aid in teaching and learning but also in the field of nursing care, such as the use of electronic records that can make life easier for professionals in patient care.

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