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Knowledge management: connections for teaching research in undergraduate nursing

Gestão do conhecimento: conexões para o ensino da pesquisa na graduação em enfermagem

Gestión del conocimiento: conexiones para la investigación docente en enfermería de pregrado

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ABSTRACT

Objectives: to understand the meanings that nursing students and professors attribute to research and research teaching in the context of undergraduate studies. **Methods**: this is a qualitative research, whose theoretical and methodological frameworks were Complexity Theory and Grounded Theory. Sixteen students and 14 undergraduate nursing professors from a public university in Rio de Janeiro were interviewed. Semi-structured interviews were used for data collection. **Results**: causes, actions, and interactions related to research and teaching research in undergraduate nursing are connected with learning science for nursing praxis, which ranges from students' ability to question to their and their professors' understanding of social demands guided by science. **Final Considerations**: nursing professors and students signify research and teaching of this as a structure for the training of nurses for the critical professional capacity needed to meet social demands.
Descriptors: Nursing; Knowledge Management; Nursing Research; Students, Nursing; Faculty, Nursing.

RESUMO

Objetivos: compreender os significados que estudantes e professores de enfermagem atribuem à pesquisa e ao ensino da pesquisa no contexto da graduação. **Métodos**: pesquisa qualitativa, cujos referenciais teórico e metodológico foram a Teoria da Complexidade e a Teoria Fundamentada nos Dados. Foram entrevistados 16 estudantes e 14 professores de graduação em enfermagem de uma universidade pública do Rio de Janeiro. Entrevistas semiestruturadas foram utilizadas para coletar os dados. **Resultados**: causas, ações e interações relacionadas à pesquisa e ao ensino da pesquisa na graduação em enfermagem estão conectadas com o aprender ciência para a práxis da enfermagem, que vai desde a capacidade de questionamento do estudante até a compreensão destes e dos seus professores sobre as demandas sociais pautadas na ciência. **Considerações Finais**: professores e estudantes de enfermagem significam a pesquisa e ensino desta como estrutura da formação do enfermeiro para a capacidade crítica profissional necessária ao atendimento das demandas sociais.
Descritores: Enfermagem; Gestão do Conhecimento; Pesquisa em Enfermagem; Estudantes de Enfermagem; Docentes de Enfermagem.

RESUMEN

Objetivos: comprender los significados que los estudiantes y docentes de enfermería atribuyen a la investigación y la docencia investigadora en el contexto de las carreras de grado. **Métodos:** investigación cualitativa, cuyos marcos teóricos y metodológicos fueron la Teoría de la Complejidad y la Teoría Fundamentada. Se entrevistó a 16 estudiantes y 14 profesores de enfermería de pregrado de una universidad pública de Río de Janeiro. Se utilizaron entrevistas semiestructuradas para recolectar los datos. **Resultados:** las causas, acciones e interacciones relacionadas con la investigación y la docencia de la investigación en el pregrado de enfermería están conectadas con el aprendizaje de la ciencia para la praxis de enfermería, que va desde la capacidad de cuestionamiento del estudiante hasta la comprensión de éste y sus docentes sobre las demandas sociales basadas en la ciencia. **Consideraciones Finales:** los profesores y estudiantes de enfermería entienden la investigación y la docencia de la enfermería como estructura para la formación del enfermero para la capacidad crítica profesional necesaria para atender las demandas sociales.
Descriptores: Enfermería; Gestión del Conocimiento; Investigación em Enfermería; Estudiantes de Enfermería; Docentes de Enfermería.

INTRODUCTION

Nursing progress is conditioned to its ability to collaborate with the development of societies based on meeting people's health demands[1-2]. For this reason, it is important to consider the complexity underlying their objects of interest, given that nurses are able to involve, in their work process, the contextual specificities in which they are inserted, without, however, decontextualizing the local phenomena of their global relationships. From this perspective, the holographic relationship of complexity appears, considering that the part is in the whole, it is contained in the parts[3]. Consequently, there is a continuous challenge of training qualified human resources to meet the dynamics of the global and local complexities of health systems[2].

From the above, the importance of updated scientific knowledge results as an axis that sustains and moves the scope of knowledge and professional performance[4]. Thus, it is pertinent to consider research as a process of high social value, as it is a condition for conceiving and developing science[5-6]. Therefore, the development of research skills is also a field of interest for nursing, since it is necessary to consider the relationship between science and social changes based on the exercise of the profession based on updated scientific knowledge[1-2,5].

On the other hand, although scientific literature presents an expressive flow of publications that consider research itself as an object of study, it is possible to consider, considering the expansion of scientific productions in the area, the importance of approaches that consider teaching research in undergraduate courses as potential context of connections between competencies for investigative practice and valorization of science as an inseparable element of training and professional praxis[7-9].

Teaching research, in this sense, implies the conditions for the development of skills that guarantee authentic knowledge, i.e., knowledge that allows progress in the scientific field, while allowing social transformations[1-2,5]. For undergraduate students, it is pertinent to highlight the need for didactic and methodological strategies, in the context of science teaching, which allow the development of critical thinking capacity for conscious actions of the profession that will become part of the title of nurse[8,10-12]. From this reality, the scientific exercise can be seen to guarantee a science with conscience, which, in the perspective of complex thinking, implies contextualized knowledge that values multidimensionality, even when the delimitation of an object is necessary, as it considers that all problems of humanity, which includes research, are inserted in a local and global context that gives them meaning[13].

Thus, it is advocated the understanding that the competencies to develop research and implement science, associated with other competencies, are conditions for nursing to continue advancing with the necessary autonomy to better intervene in the different health contexts and socio-political scenarios that permeate the demands and care actions[14], resulting from this process, the logic of the recursive circuit principle of complexity, considering that "products and effects are themselves producers and causes of what produces them"[3]. Therefore, the progress of nursing science can be directly related to the development of skills for science even in the training of nurses. Therefore, it is pertinent to know the factors that can influence the scientific progress of nursing, based on the importance of the connections between science and the work process, with a view to quality of health care.

Among the potential intervening conditions of this process, the meanings that nurses' attributes to research and research teaching may be relevant to the involvement that this professional establishes with the development and consumption of science[7]. About this, it is worth reiterating the context of professional training, graduation, as a starting point for the valorization of research by nurses[9,15].

Furthermore, the underlying complexity of the vocational training system is based on the interactions of various elements, including students, professors and the context of work and teaching-learning conditions that permeate this process[8,16-17]. In this regard, it is important to highlight the importance of deepening knowledge about the factors that influence, in the field of meanings, the formation of nurses' scientific spirit within the scope of teaching research in undergraduate courses, especially from the complex perspective that contemplates the meanings of professors and students inserted in this process of academic and professional development[8-9]. This potential reality results in the potential relevance and justification for the results of this research. Therefore, it is considered pertinent to deepen the understanding of the reality that can explain the following research question: what meanings that professors and undergraduate nursing students attribute to research and the teaching of research in the training of nurses at the university level?

OBJECTIVES

To understand the meanings that nursing students and professors attribute to research and research teaching in the context of undergraduate studies.

METHODS

Ethical aspects

The research was approved by the Research Ethics Committee (REC) of a federal public university in Rio de Janeiro. Participation in the research took place voluntarily, after clarification and signing of the Informed Consent Form. To maintain participants' anonymity, they were characterized, alphanumerically, according to the sample group of origin and the sequence of the interview.

Theoretical-methodological framework

For data systematic organization and treatment, Grounded Theory[18] was used as a methodological framework. For the interpretation of data and theoretical abstraction, Complexity Theory was used as a theoretical framework[3,12]. It should be noted that Complexity Theory aims to understand social, cultural and even biological phenomena from the connections established between the elements that integrate these phenomena, with emphasis on the context from which they emerge and the multidimensionality involved in them[13].

Grounded Theory consists of a method capable of generating, from a comparative analysis between data, categories and subcategories, a complex web that allows the understanding of

the investigated phenomenon[17]. As it involves a paradigm that positions the categories generated in a multidimensional perspective when considering contextual, causal, intervening elements of action-interaction of the phenomenon, Grounded Theory is aligned with the epistemology of complexity. In this way, the relationships between Grounded Theory and Complexity Theory provide coherence to the theoretical, technical, epistemological and morphological poles of scientific research[19].

Type of study

This is a qualitative research, whose methodological rigor was guided by the COnsolidated criteria for REporting Qualitative research (COREQ). The study design directed towards the type of explanatory research, since the investigated phenomenon sought to achieve the research objective from connections between concepts for understanding the factors that contribute, determine, or structure meanings about research and research teaching in undergraduate nursing in its epistemological relationship between subject/image/object of knowledge[20-21].

Methodological procedures

Data collection, based on semi-structured interviews, followed the analytical steps of Grounded Theory, which consist of open, axial and integration coding. In the open coding stage, the concepts were identified from comparisons between their dimensions and properties. By dimensions and properties, it is understood the data particularities that give different intensities for the same phenomenon mentioned, for instance, by the participants. From this stage, the preliminary codes emerged, whose provisional titles were elaborated taking into account data properties and dimensions. From preliminary codes, the comparison between them was initiated with a view to grouping them into conceptual codes[17].

The next step was the axial one. At that moment, the formation of cattlemen and their respective subcategories started from the grouping of conceptual codes[18]. Therefore, in the axial, the data were grouped, previously separated in open coding.

Integration, the third analytical stage, performed the comparison and analysis of categories and subcategories, continuously, aiming at deepening and connections between categories, which can also be considered as a stage of interactions between concepts for a deeper explanation of the phenomenon[18-19].

Study setting

Unveiling meanings from the lived experience, that is, apprehended from the senses, and decoded through the subjectivities that permeate the process of building meanings in the face of a given phenomenon, implies considering a scenario rich in possibilities so that it is possible to reach the depth necessary for what one wants to know. In this sense, the research setting was an undergraduate nursing course at a federal public university, located in northern Rio de Janeiro, Rio de Janeiro State.

This course, duly recognized by the Ministry of Education of Brazil, presents, among its peculiarities for teaching research, eight mandatory research courses, including the course related to the development of the Course Conclusion Work (CCW). The choice of this scenario was, therefore, due to the peculiarity of its context in relation to the potential development of research teaching in the undergraduate nursing course. Thus, it is suggested, in order to reach the depth of participants' meanings in relation to the teaching of research, in addition to the theoretical and methodological elements, it was necessary to delimit the research scenario coherent with the experience and experience of potential participants in face of the phenomenon "teaching research in undergraduate nursing".

Data source

Considering the holographic principle of complexity, which points to the reality in which the whole constitutes the part and the part is inserted in the whole, as well as the research scenario, participants also need to present experiences in relation to the phenomenon investigated: teaching research at undergraduate level. Therefore, the research participants constituted two sample groups, professors and undergraduate nursing students.

Despite the theoretical sampling, in Grounded Theory, designating, generally, only one initial group for the research object in question, as well as from the perspective of complexity, it was considered necessary to form the two groups mentioned above. Professors of the undergraduate nursing course, with professional experience as a professor in the undergraduate nursing program equal to or greater than one year were included. Professors working at the institution, as substitutes or temporary staff, as well as those who were on vacation or on leave of any kind during the data collection period were excluded.

For the group of students, nursing students who were taking the last year of the undergraduate course were included. Students who have already taken another undergraduate course (in any area of knowledge) were excluded, since given the experience of a completed undergraduate course they could have different meanings from the object of study selected here. Thus, from the aforementioned criteria, for convenience, 30 participants were selected, being 16 students and 14 nursing professors.

In order to recruit participants, formal contacts were established, in person, in the institution's space, which conformed the research setting. From the first data collections, new participants were sought, according to the analytical need of the research based on the hypotheses generated in the analytical course. It should be noted, in this sense, that one of the characteristics of Grounded Theory is a simultaneous data collection and analysis. This movement, based on the help of memos and diagrams, corroborates the possibility of the emergence of hypotheses, during the investigative course, which may direct the need for data collection with other participants in the same sample group or, even, with new sample groups.

The selection of participants was guided by theoretical, non-probabilistic sampling, which, at Grounded Theory, consists of maximizing comparative opportunities for facts or incidents to determine how a category varies in terms of its properties and dimensions[18].

Data collection and organization

For data collection, we used a semi-structured interview, carried out between June 2017 and May 2018, concomitantly with

the two sample groups, whose guiding questions were: what do you understand by scientific research? Tell me about teaching research in the undergraduate nursing course. However, aiming at the depth of understanding of the investigated phenomenon, as the researchers considered necessary, circular questions were used.

Anticipating the interview, a questionnaire was applied with closed questions for the characterization of the participants, whose focus was to identify the profile in relation to the involvement with the research in their professional performance process and/or university education. The average interview time was 35 minutes, held at the institution itself, in a quiet and reserved place.

Data analysis

Data analysis occurred from the coding process, which, in Grounded Theory, consists of comparative analysis, on three levels: open, axial, and integration[17]. The categories were ordered according to the paradigmatic model[17]. This scheme allows explanatory coherence based on the connections between the dimensions that support the object of study. Its structure is organized based on conditions, actions-interactions and consequences.

RESULTS

Of the 14 professors who made up the first sample group, all were nurses, with nine doctors and five masters in nursing, three of whom were studying for a doctoral degree in nursing. Regarding the institutional link with the research scenario, 12 professors had 40 hours a week dedicated exclusively to the university and two appeared to have a 20-hour week link. All guided undergraduate students in research projects, ranging from scientific initiation (SI) and CCW. Only two professors completed their undergraduate nursing courses in private institutions. None of the interviewees guided research in *Stricto Sensu* Graduate. The average professional experience, as a professor, in the institution that conformed the research scenario, was 4.2 years.

The second sample group consisted of 16 students, of whom 14 stated that they had already worked as SI scholars and seven of them were, at the collection time, participating in SI activities. All respondents in this group have been linked to a research project, during the course of undergraduate nursing, for a period equal to or greater than one year. Eight students said they were part of a research group.

From analysis of the interviews, categories emerged that revealed, in a complementary relationship between the perceptions of nursing professors and students, the meanings these actors give to research and research teaching, presenting peculiarities that signaled challenges and strategies in this context of interactions.

This process resulted in the central research phenomenon entitled: *Teaching research in undergraduate courses: connections to a complex system of scientific knowledge management in nursing*, which is influenced, in its development, by the conditions represented in the category *Scientific development and research teaching based on the meanings attributed by professors and undergraduate students in nursing*, presenting possibilities for actions-interactions that constitute strategies for their strengthening based on the *Scientific research and its purpose: connections for the valorization and development of Science* category. Both were presented below, but it should be noted that, for the purpose of illustration, the participants were designated, in the presentation of results, with alphanumeric representation. In this sense, "S" means student and "P" means professor, followed by the number corresponding to the interview order.

Scientific development and research teaching based on the meanings attributed by professors and undergraduate students in nursing

This category has three subcategories, namely: *Scientific research: meanings attributed by professors and undergraduate nursing students*; *Valuing scientific development and teaching research in nursing*; *Strengths and challenges of research teaching in the context of undergraduate nursing.*

The first subcategory revealed that the development of scientific research is conceived by nursing students and professors as a mechanism capable of responding to the call of doubt, properly questioned in the scientific field. Mostly, this process implies the possibility of the research problem being put to the test from the systematic movement of the methodologies to arrive at the scientific knowledge that answers the initial questioning, as exemplified in the following excerpts.

> [...] *I understand that scientific research is when we want to investigate something, want to know, want to find out why certain situations happen. I think it's finding an explanation for something, finding out what's going on* [...] *to justify it.* (S2)

> *Scientific research, for me, is any search for knowledge based on a guiding question. There has to be a main reason to guide your research, your search for answers.* (S3)

> [...] *scientific research is that you have the possibility to find some kind of problem somewhere that you see* [...] *there, you study, you research.* (S12)

> [...] *it is when you have a doubt, a problem, and you will try to solve this problem with scientific evidence.* (P3)

> *Scientific research is a product that comes from questioning and establishing a method* [...] *can you show it to your peers and beyond your peers.* (P8)

Consequently, connections are established between research and science. At this juncture, they seem to value science and its development.

> [...] *research is the way we have to identify factors that are determinants for science, that will modify, unveil, or better explain some phenomenon.* (P2)

> *I understand that science is the way of explaining or describing the phenomena of the universe.* (P7)

> *Science, for me, is what moves the world, I think. Science is what will move things for better or for worse, it will depend on each one. In science, they tend to discover many things.* (S9)

Furthermore, professors and students attribute positive meanings to the practice and teaching of research in undergraduate nursing, as demonstrated by the *Valuing scientific development and teaching research in nursing* subcategory.

For students, research is conceived as an indispensable element in their training process, because it is related to the process of knowing and knowledge.

> [...] *I think it is very important for our academic construction, especially in undergraduate nursing, that we always have to seek to know more for nursing care with more property.* (S1)

> *This experience with research is important* [...] *now I am becoming more interested in learning, because I know that I still have many difficulties in preparing a scientific article.* (S10)

> *Scientific research is very important, because, at graduation, we are starting to create new knowledge. So, scientific research helps a lot in that you discover new knowledge, expand the knowledge that we are seeing.* (S13)

In line with this reality, nursing professors value teaching research at undergraduate level, while recognizing it as necessary for establishing connections for knowledge.

> *In my experience, teaching research at undergraduate level needs to be given.* (P2)

> *So, I understand that in undergraduate nursing it is essential because he needs to make this connection with the theory that he learns with practice.* (P3)

> *So, you feed the research and enable the student to, through dialogue, do health education. I find this process quite interesting in relation to research.* (P10)

In contrast, the *Strengths and challenges of research teaching in the context of undergraduate nursing* subcategory reveals strengths and challenges that permeate the teaching-learning of research in undergraduate nursing.

In this sense, for students, among the factors that can favor the teaching-learning process of research, is the motivation to research. This motivation seems to have a direct relationship with the peculiarities of individuals, related to their ability to question reality, while finding, in this ability, motivation to better know from scientific research.

> *I feel motivated to research because I am curious. The faculty has awakened these curiosities to me.* (S3)

> [...] *we end up asking a lot of things and then I end up motivating myself to look for something on this subject. The research comes from me, most of the time.* (S9)

> [...] *I am a very questioning person in life. I question everything and I think we have to seek answers in all ways, whether in everyday practice or in the scientific world. So, I think it is very important, it validates these questions, it is there to answer us.* (S7)

Considering that the teaching-learning process is a complex phenomenon capable of influencing and being influenced by the context, the limitations pointed out by professors in the field of didactic strategies for teaching research are highlighted. Additionally, elements of the education system's purpose were signaled by professors in relation to the development of students' skills to research.

> [...] *looking at professors' side, I see that they are still very grounded in that particular book, that knowledge, in quotation marks, which is enshrined, but which may have already been overcome.* (P3)

> *I think that we still have to improve the teaching of the tools that we use in research, focusing more on the method.* (P5)

> *The professor needs to have teaching strategies, not research, so that the student realizes the importance of research in their training process, such as, for instance, the development of active methodologies.* (P7)

> [...] *I think that there is a very big focus to train people to study a master's and doctorate* [...] *this culture of the little scientist, in nursing, does not extend to other courses and this is interesting to think: what weight, how is this changing the profile of our students and future nurses?* (P10)

Thus, the next category addresses the importance of nursing students to learn research from the role and social value that science represents for humanity and, therefore, for the interdependent relationship between nursing and society.

Scientific research and its purpose: connections for the valorization and development of science

It evidences the need for students to incorporate and value the practice of research as an element of their education and, consequently, of their future performance as a nurse. It emerges from this reality the strengthening of connections between nursing, science, and social impact.

Thus, the *Understanding the social value of research: elements for a science with awareness* subcategory presents the perspective of nursing students and professors to learn and develop research as a desirable social ethical commitment to the professional training process of nurses, from the understanding of the possible impacts and purposes of the research.

> *Researching in nursing, mainly, is returning to the context.* (S1)

> [...] *I think research is a way for us to be able to change the world.* (S2)

> [...] *the actions see a need, which you identify, and when you wake up to that need, your practice changes, in the sense that you will always be questioning what you are doing, the result of that, if that part that is really the best, if you're really doing it in the best way. All of this provides students with the restlessness of their own practice, that is, the ability to always be reflecting on this practice, to be generating critical thinking over what they are doing.* (P11)

> *I think it would be to understand what the research is for, because they know they need to do it, but they don't understand what the research is for.* (P1)

> [...] *they have to understand the importance of doing research, so, in my understanding, it is mandatory for students to understand the importance of research so that they can develop their practice.* (P3)

When considering the social connections of the research, students and professors establish approximations of this reality with the nursing work process. Thus, the *Science and the nursing care dimension: connections for valuing research teaching* subcategory highlights the interdependence relationship between nursing praxis and updated scientific knowledge, valuing the importance of teaching research, as demonstrated in the following excerpts.

> *I see that research improves assistance. When we have new updates, it ends up improving, because we can provide patients with better care, more effective care with these updates.* (S2)

> *I see that research is important for assistance, because then assistance will be qualified, nurses will know how to talk about the issues, they will know how to substantiate the reason why for that assistance.* (S10)

> *I see research teaching as a fundamental step so that people, after training, mainly, can continue to develop critical thinking in nursing, because a nurse who is unable to carry out scientific research is very limited to his/her praxis and ends up not exercising what is science.* (P8)

> *The benefit* [for nurses] *is the development of a practice that is not based on empiricism, but a practice that is more based on data from scientific studies and, therefore, a more careful, more cautious practice in decision making in relation to patients* [...] *so, I think that research helps in this sense, to bring clearer information, evidence, that will better support their practice.* (P2)

The results reveal, therefore, a transversal relationship between teaching research in the undergraduate nursing program based on the understanding of students and professors about the professional and social demands based on science and the need for the development of skills, even in the context of graduation, capable of meeting such demands from nursing care.

DISCUSSION

The scientific spirit[22] development is conditioned to the human capacity to ask questions that direct the progress of knowledge. In this regard, the results of this study pointed, satisfactorily, to the construction of meanings for research as a process to answer the call of doubt, from the formulation of questions.

Thus, in the context of research teaching, it is necessary to highlight the importance of nursing professors understanding and valuing the student's critical-reflexive movement in the construction of a research problem, because it is from this capacity that science finds initial conditions for its development[22-23]. Therefore, it is necessary that professors remain in an open system to learn how to learn[17]. From this reality, it will also be possible to encourage the involvement of future nurses with the consumption, development and application of research in their work process[8].

The systematized doubt in question is a principle for the process of learning through research to do science. Moreover, surveillance of critical thinking with a view to maintaining scientific knowledge implies the constancy of knowing how to question, applying criticality to the principle that knowledge, in science, is dynamic and complex[13,22-23]. Otherwise, it becomes dogma or, at least, an outdated knowledge[21].

It emerges from this process possibilities for guaranteeing the authority of the argument based on scientific bases for updated knowledge that, in turn, can support nurses' decision-making consistent with the challenges of the health and care systems. That said, it is possible to consider that the meanings attributed by nursing students and professors about teaching research reveal the valorization of the argument based on scientific evidence, since the defense of knowledge in science is no longer justified, resulting from the conclusion that it starts from consensual ideas of experts for a knowledge of authority[23-24].

The reality of undergraduate nursing education, on the other hand, reveals multiple challenges, but which converge to the importance of strategies that favor the development of skills for students' reflective critical thinking and, therefore, the professional future. Indeed, numerous methodological approaches stand out, among which evidence-based learning[10] and clinical teaching[25] based on research, in addition to other approaches that use non-traditional teaching methods[11].

The meanings that reveal the teaching-learning process of nursing research based on the supposed transmission of knowledge are not limited to the Brazilian context[25]. Static teaching, which starts from non-updated knowledge, can be considered a phenomenon that has multiple roots. However, from the perspective of complexity and authors who demand efforts for epistemological progress, it can be considered that, at least in part, this reality is due to a system that feeds back between professors who learned research in isolation, decontextualized and sterile in their connections with social return and, in effect, give their students the same limited approach to research[13,22-23].

On the other hand, by positively meaning research and science, the nursing students in this study showed evidence that they value the practice of research as an indispensable element in their training process. This same reality is pointed out in other scenarios and, as a complex phenomenon, it has multiple facets, of which it is possible to highlight the contextual relationship and influence of professors, especially when being able to weave approximations between the teaching of research and the purpose of their results in scope of nurses' work[4,8,25-27].

About this, it is worth highlighting the importance of science[13] with awareness in the process of training nurses. This movement implies, therefore, the concern that the teaching of research contemplates the organic relationship of knowledge, that is, establish connections between the scientific principles that guide the delimitation of the object, methodological development, ethical aspects and the process of disseminating and assessing the impact of research results on society. This process results in knowledge management that values research as a way to arrive at an authentic science, which establishes connections with social development and not only in the isolated movement of academic production[15,26-27].

The isolated teaching of research, or the process of doing research only to meet professors' demands, supports the concern signaled by one of the participants in this study when considering that the "culture of the little scientist" can result in undesirable reflexes in the profile, nurses who, in this context, must relate

science in a transversal way with their professional practice. This positioning is not, however, specific to nursing. There are those who maintain the prerogative, for instance, that the Brazilian university, in recent years, has demanded more concern in training researchers than good professionals[27], as if there was a dissociability between science, academic course and profession.

Furthermore, the understanding that research is an educational principle inseparable from professional training[22] is advocated, because it is from this process that it is possible to achieve dynamic and updated knowledge, meeting social demands as well as scientific progress, technological and innovation[7]. Therefore, in this dialogical movement, the capacity to take the teaching of research as a path to science fits, and, in this glimpse, conceive science as a dimension that structures societies based on professions, which translate scientific knowledge when developing their work processes

The surveillance mechanism to conceive science as a social value, capable of boosting the development of humanity, may be in the capacity to think and value science with awareness[13]. Therefore, this process must be initiated in its bases, namely: in the teaching of research, which, in turn, can influence the construction of meanings that people attribute to research and science and, therefore, reflect on the way in which involve and use scientific research[14].

Study limitations

The study limitations are centered on the conditions of the context in which the data emerged, since, at the same time that it was conducive to the field of meanings, in depth, about the research and teaching of this, it is possible to consider that other realities, such as that of teaching in the private sector, may present different perspectives. On the other hand, it is recommended to replicate similar studies, including with students and professors from other areas of knowledge.

Furthermore, it is worth highlighting, as a potential limiting factor of the research, the relationship of the researcher with students, since, in the field of meanings, it is not possible to accurately assess the interference that the relationships of social bonds may reflect between researcher and research participant at the time of the interview. Additionally, it is necessary to consider the moment in which the students who formed the second sample group were in relation to the period of completion of the course, since the last year of graduation may attribute some specificity to the field of meanings for teaching research. However, this potential limitation, of course, can also be reflected as a strength, since this student experienced different stages of the graduation process that may give different meanings to those who are still in the initial stages of the course.

Contributions to nursing

The results of this research may assist, from the complex thinking, nursing in reflective understanding about the teaching of research in undergraduate courses, through interconnected meanings between professors and students about research and its teaching. Therefore, it can boost the development of science and the nursing profession, given that in the field of science, it can favor the capacity of nurses to internalize research as a principle of their training and professional practice.

Regarding profession, in the care dimension, it can strengthen nurses' autonomy based on the ability to value research as a principle of decision-making and qualified practices based on updated scientific knowledge.

FINAL CONSIDERATIONS

The research's originality rests on the dialogical relationship from which the results emerge, since, when considering the meanings of professors and undergraduate students in nursing, in the perspective of complexity, it is possible to approach the object that favors the understanding of dimensions related to meanings that these actors attribute to research and its teaching.

The results showed that nursing professors and students who experience the teaching-learning process of research signify research and its teaching in a positive way and, in line with the principles of science, especially with regard to the capacity of formulating a research problem and critical thinking as early movements of science.

Moreover, nursing professors and students highlighted elements for a science with conscience, that is, a science that establishes connections with its *raison d'être*: the development of societies. However, some weaknesses in the field of teaching research have also emerged, with emphasis on methodological approaches that encourage students to think and practice science based on research as a principle of their professional training.

REFERENCES

1. Mendes IAC, Ventura CAA, Queiroz AAFLN, Sousa ÁFL. Global Health Education Programs in the Americas: a scoping review. Ann Global Health. 2020;86(1). https://doi.org/10.5334/aogh.2745
2. Salvage J, White J. Our future is global: nursing leadership and global health. Rev Latino-Am Enfermagem[Internet]. 2020 [cited 2020 Oct 31];28:e3339. https://doi.org/10.1590/1518-8345.4542.3339
3. Morin E. A cabeça bem-feita: repensar a reforma, reformar o pensamento. 18 ed. Rio de Janeiro: Bertrand; 2010. 128p.
4. Vieira ACG, Gastaldo D, Harrison D. How to translate scientific knowledge into practice? concepts, models and application. Rev Bras Enferm. 2020;73(5):e20190179. https://doi.org/10.1590/0034-7167-2019-0179
5. Silva ÍR, Leite JL, Trevizan MA, Mendes IAC, Silva TP, Lins SMSB. Learning through research: from teaching science to the sphere of nursing care. Esc Anna Nery. 2017;21(4):e20160329. https://doi.org/10.1590/2177-9465-ean-2016-0329

6. Crochík JL, Massola GM, Svartman. Ciência e Política. Psicol USP. 2016;27(1):1-5. https://doi.org/10.1590/0103-656420162701

7. Lino MM, Backes VMS, Costa MASMC, Martins MMFP, Lino MM. Research in nursing: Brazil and Portugal in the construction of professional identity. Texto Contexto Enferm. 2018;27(1):e6550015. https://doi.org/10.1590/0104-07072018006550015

8. Silva ÍR, Leite JL, Trevizan MA, Silva TP, José SAP. Connecttions between research and health care assistance: emerging challenges for science, innovation and technology in nursing. Texto Contexto Enferm. 2017;26(4):e2470016. https://doi.org/10.1590/0104-07072017002470016

9. Lima RS, Silva MAI, Andrade MS, Góes FSN, Mello MA, Gonçalves MFC. Construction of professional identity in nursing students: qualitative research from the historical-cultural perspective. Rev Latino-Am Enfermagem. 2020;28:e3284. https://doi.org/10.1590/1518-8345.3820.3284

10. Sayyah M, Shirbandi K, Saki-Malehi A, Rahim F. Use of a problem-based learning teaching model for undergraduate medical and nursing education: a systematic review and meta-analysis. Adv Med Educ Pract [Internet]. 2017 [cited 2020 Feb 13];8:691–700. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5633274/

11. Lee J, Lee Y, Gong S, Bae J, Choi M. A meta-analysis of the effects of non-traditional teaching methods on the critical thinking abilities of nursing students. BMC Med Educ [Internet]. 2016 [cited 2020 Feb 14];15(esp);16(1):240. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5025580/

12. Knight SE, Wyk JMV, Mohoamed S. Teaching research: a programme to develop research capacity in undergraduate medical students at the University of KwaZulu-Natal, South Africa. BMC Med Educ [Internet]. 2016 [cited 2020 Feb 22];16:61. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4754994/

13. Morin E. Ciência com consciência. 13 ed. Rio de Janeiro: Betrand; 2010. 350p.

14. Mendes IAC, Ventura CAA, Silva ÍR. Alignment and contribution of nursing doctoral programs to achieve the sustainable development goals. Hum Resour Health. 2020;86(2020). https://doi.org/10.1186/s12960-020-00530-7

15. Ochoa-Vigo K, Vidal CB, Benites MEV, Ruiz-Garav MI, Borjas GAM. Percepción y actitud del universitario de enfermería sobre su formación en investigación. Rev Med Hered [Internet]. 2016 [cited 2020 Feb 15];27:204-05. Available from: http://www.upch.edu.pe/vrinve/dugic/revistas/index.php/RMH/article/view/2989/2887

16. Perucchi V, Mueller SPM. Produção de conhecimento científico e tecnológico nos Institutos Federais de Educação, Ciência e Tecnologia: uma investigação sobre a sua natureza e aplicação. Perspect Ciênc Infor. 2016;l(21):134-51. https://doi.org/10.1590/1981-5344/2503

17. Altet M. L'observation des pratiques enseignantes effectives em classe: recherche et formation. Cad Pesqui. 2017;47(166):1196-23. https://doi.org/10.1590/198053144321

18. Corbin J, Strauss A. Basics of qualitative research: techniques and procedures for developing Grounded Theory. California: SAGE; 2015. 456 p.

19. Lacerda MR, Santos JLG. Teoria Fundamentada nos Dados: bases teóricas e metodológicas. Porto Alegre: Moriá; 2019. 408 p.

20. Gil AC. Como elaborar projetos de pesquisa. São Paulo: Atlas; 2017. 192 p.

21. Hessen J. Teoria do conhecimento. São Paulo: WMF Martins Fontes; 2012. 177 p.

22. Bachelard G. A formação do espírito científico: contribuição para uma psicanálise do conhecimento. Rio de Janeiro (RJ): Contraponto; 1996. 316 p.

23. Demo P. Aprender como autor. São Paulo (SP): Atlas; 2015. 208 p.

24. Jimenez-Aleixandre MP, Brocos P. Desafios metodológicos na pesquisa da argumentação em ensino de ciências. Ensi Pesqui Educ Cienc. 2015;17(esp.):139-59. https://doi.org/10.1590/1983-2117201517s08

25. Zhi LM, Dan WF. Innovation and Research of Teaching Way of Clinical Nursing Interns in Internal Neurology Department. Iran J Public Health [Internet]. 2016 [cited 2020 Feb 22];45(6):824–5. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5026842/

26. Birks M, Ralph N, Hillman RC, Tie YC. Teaching science content in nursing programs in Australia: a cross-sectional survey of academics. BMC Nurs [Internet]. 2015 [cited 2020 Feb 23];14:24. Available from: https://bmcnurs.biomedcentral.com/articles/10.1186/s12912-015-0074-x

27. Barranti V. Ensino e pesquisa: atividades conflituosas. Rev Bras Educ Fis Esporte [Internet]. 2015 [cited 2020 Feb 23];29(1):159-62. https://doi.org/10.1590/1807-55092015000100159