

Theoretical model for management of nursing research groups



Modelo teórico para gestão de grupos de pesquisa em enfermagem
Modelo teórico para la gestión de grupos de investigación en enfermería

Greici Capellari Fabrizzio^a 
Alacoque Lorenzini Erdmann^a 
José Luís Guedes dos Santos^a 

How to cite this article:

Fabrizzio GC, Erdmann AL, Santos JLG. Theoretical model for management of nursing research groups. Rev Gaúcha Enferm. 2023;44:e20220254. doi: <https://doi.org/10.1590/1983-1447.2023.20220254.en>

ABSTRACT

Objective: To develop a theoretical model for management of research groups in nursing graduate programs.

Method: This is a Grounded Theory developed in a stricto sensu nursing graduate program of a public university. Data collection was conducted from April to October 2018 and the theoretical sample consisted of 21 participants arranged in three sample groups.

Results: Research activities are linked to research groups, which require human, material and financial resources to develop their studies. These conditions call for management strategies and national and international interactions that result in theoretical, scientific and technological development of the profession.

Final considerations: The theoretical model for management of research groups can serve as a guide for graduate programs in nursing and health for planning the work process and so that they can contribute with research of great impact for society.

Descriptors: Universities. Research groups. Education, nursing, graduate. Organization and administration. Grounded theory.

RESUMO

Objetivo: Elaborar um modelo teórico de gestão de grupos de pesquisa para programas de pós-graduação em enfermagem.

Método: Trata-se de uma Teoria Fundamentada nos Dados desenvolvida em um programa de pós-graduação em enfermagem stricto sensu de uma universidade pública. A coleta de dados foi realizada de abril a outubro de 2018 e a amostra teórica foi composta por 21 participantes dispostos em três grupos amostrais.

Resultados: As atividades de pesquisa estão vinculadas a grupos de pesquisa, que necessitam de recursos humanos, materiais e financeiros para desenvolver seus estudos. Essas condições pedem estratégias de gestão e interações nacionais e internacionais que resultam em desenvolvimento teórico, científico e tecnológico da profissão.

Considerações finais: O modelo teórico de gestão de grupos de pesquisa pode servir como guia para programas de pós-graduação em enfermagem e saúde para planejamento do processo de trabalho e para que possam contribuir com pesquisas de grande impacto para a sociedade.

Descritores: Universidades. Grupos de pesquisa. Educação de pós-graduação em enfermagem. Organização e administração. Teoria fundamentada.

RESUMEN

Objetivo: Elaborar un modelo teórico de gestión de grupos de investigación de un programa de posgrado en enfermería.

Método: Se trata de una Teoría Basada en Datos desarrollada en un programa de postgrado de enfermería stricto sensu de una universidad pública. La recogida de datos se llevó a cabo de abril a octubre de 2018 y la muestra teórica estuvo compuesta por 21 participantes dispuestos en tres grupos de muestra.

Resultados: Las actividades de investigación están vinculadas a los grupos de investigación, que necesitan recursos humanos, materiales y financieros para desarrollar sus estudios. Estas condiciones exigen estrategias de gestión e interacciones nacionales e internacionales que den lugar al desarrollo teórico, científico y tecnológico de la profesión.

Consideraciones finales: El modelo teórico de gestión de grupos de investigación puede servir de guía a los programas de posgrado en enfermería y salud para planificar el proceso de trabajo y que puedan contribuir con investigaciones de gran impacto para la sociedad.

Descriptorios: Universidades. Grupos de investigación. Educación de postgrado en enfermería. Organización y administración. Teoría fundamentada.

^a Universidade Federal de Santa Catarina (UFSC). Centro de Ciências da Saúde. Programa de Pós-Graduação em Enfermagem. Florianópolis, Santa Catarina, Brasil.

INTRODUCTION

Research groups in the nursing field showed an increase of 146% in the last ten years, from 251 in 2006 to 617 in 2016, however, of the 251 found in 2006, 43 (17%) were not found in 2016, which represents the closure of an important part of groups over the years⁽¹⁾. On the other hand, a study conducted in Germany identified that many important discoveries in science were made by new research groups⁽²⁾.

The emerging demands of research problems, such as complexity and interdisciplinarity, require a combination of knowledge by researchers in the search for solutions, for this research is conducted in research groups that have researchers interested in a particular topic of study⁽³⁾.

Research groups encompass a group of individuals organized according to their competence in the scientific or technological field and their involvement in research activities. These groups are organized around lines of research, areas of concentration, and their components share resources in different degrees⁽⁴⁾.

Metrics for excellence groups are different between countries. In the United Kingdom, research groups considered to be of excellence in the health area achieve three productivity measurements: the number of publications, the impact factor of the journals in which the articles are published and the number of citations⁽⁵⁾.

For research groups to achieve the results proposed, some factors such as management and leadership influence their academic performance. Leadership links to the construction of a challenging research agenda and the incentive and inspiration of researchers to fulfill the schedule. While management is concerned with the organization of the work process to ensure the execution of projects and improve the group's functioning processes⁽⁶⁾.

However, considering the importance of management processes to organize the work process and the good performance of activities within the research group, it was not found in the scientific literature, a theoretical model that guides the actions of researchers within research groups. Thus, this research aimed to develop a theoretical model for managing research groups for nursing graduate programs.

METHOD

Qualitative research, theoretically and methodologically set in the Straussian line of Grounded Theory (GT), which aims to build a theory from the meanings of the phenomena for the participants⁽⁷⁾.

This research methodology is characterized by the understanding of different aspects in which the research is inserted:

political, social and historical aspects, valuing the social meanings attributed from human action, turning to the understanding of "what" and "how" certain phenomenon happens⁽⁸⁾.

For the immersion of the theoretical model, a paradigmatic model is adopted as an analytical tool, which uses certain techniques and procedures for data collection and analysis and involves a rigorous process of organization and integration of concepts, logically systematized⁽⁸⁾. In addition, for the immersion of the phenomenon through the theoretical model, conditions are necessary for its occurrence, action and interaction between the data that lead to a consequence. Thus, the theoretical model is revealed from the data and the integration that occurs between them⁽⁸⁾.

The study setting was 14 research groups linked to a *stricto sensu* Graduate Nursing Program of a public university in the southern Brazil, conceptualized with grade 6 by the Coordination for the Improvement of Higher Education Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* - CAPES), recognized for training 780 masters and doctors from Brazil and abroad. The 14 research groups were registered in the Brazilian Research Groups Directory and were certified by the institution, 10 updated in 2018. From the 14 research groups linked to the program, 10 groups had participants in the study.

The theoretical sampling of the study consisted of 21 researchers, participants of nursing research groups, selected for convenience as they responded to the invitation email to participate in the research. There were no refusals to participate in this study.

The participants were divided into two sample groups. The first sample group consisted of ten leaders and vice-leaders of research groups, and had as its guiding question: "What meanings do you attribute to the management of the research group?". Nine students and two former leaders formed the second sample group, since the hypothesis was identified, in the first sample group that the management of the research groups occurred in a shared way with the other members of the group. Thus the second sample group was created to respond to the research hypothesis: "Does the management of research groups of a graduate nursing program occur in a shared way among the group members?".

The inclusive criteria for both sample groups were: university professor, leader or vice-leader of nursing research groups for one year or more, master's and doctoral advisors, students participating in nursing research groups for three months or more, volunteer professors and former leaders of research groups. The exclusive criteria for both groups were: students and professors withdrawn from the university for any reason during data collection.

The participants were invited to take part in the research by e-mail, and then the interviews were scheduled for a date and time that was most suitable for participants. Data collection took place from April to October 2018, in a private room with only one participant and researcher, at the participants' workplace, through open interviews recorded with a smartphone, with an average duration of 38 minutes. After transcription, the document with the full interview was sent by e-mail so that participants could validate their statement. When doubts emerged regarding the participants' statements or some fact mentioned that required further deepening, the researchers requested complementation at that time. However, it was not necessary to repeat interviews.

The interviews were conducted by the main author of the article, a master's student in nursing at the Nursing Graduate Program, in which the research was conducted, thus, there was a relationship with the study participants before the beginning of data collection and the participants knew their personal goals and reasons for developing the research. The researcher had previous experience with qualitative research and data collection through interviews. The interview script was tested through two pilot interviews conducted before data collection, in which the participants suggested minor changes in the spelling of the questions to ease understanding.

Data collection ended with the theoretical saturation of data from the moment that no new information and the categories were well developed as for properties, dimensions and validity.

Data organization and analysis were performed using the NVIVO® software. The data analysis was performed by a single coder and classified into three interdependent moments (open coding, axial coding, and integration), according to the GT proposition. The open coding or conceptualization is the first moment of the analysis, in which the data are analyzed line by line to identification of the events, to group them by similarity. In axial coding, data were organized into subcategories, based on the initial phenomena. This analytical process of constant comparison of data is based by the paradigmatic model and comprises three dimensions, namely: condition, actions-interactions and consequences. The "conditions" are understood as the necessary reasons for the occurrence of a certain phenomenon, as well as the explanations given by the participants for the situation; "actions-interactions" are understood as the movement and meanings attributed to specific situations; "consequence" therefore expresses expected or real outcomes and results.

Finally, integration is the phase of merging categories and subcategories, in which the process between relationships and interactions, associated with the analytical component, lead to the immersion of the studied phenomenon⁽⁷⁾.

From the analysis of the constructs and the need to direct the analytical phase of the study, memos and diagrams were created in order to deepening the theoretical density of the research and deepening the hypotheses. In addition, the theoretical model was validated by three experts in the methodology and by five research group participants as proposed by the method used. The validators made suggestions for adjustments in some categories and subcategories, after making the changes they approved the theoretical model and felt represented by the phenomenon. They also highlighted the relevance of the study in an area still little explored in the Nursing scientific literature.

The provisions of Resolution n. 466/2012 of the National Health Council were complied. The study was approved by the Research Ethics Committee with Human Beings, under Opinion no.2,595,322 and Presentation Certificate for Ethical Appreciation 81636317,0,0000,0121. The participants were informed about the objectives and methodology adopted in the research. Those who agreed to participate in the study signed the Free and Informed Consent Form. To maintain the confidentiality of the information and the secrecy of the participants, the interviews were coded with the letter "P" and the number corresponding to the order in which the participants were interviewed.

■ RESULTS

The research had as participants 21 researchers, aged between 20 and 67 years, among them, one male and 20 female. As for experience with research, it ranged from three months to 11 years and the time of participation in research groups ranged from six months to 40 years. Teaching time ranged between 12 and 53 years; the time working in graduate school ranged from two to 40 years and the time leading the groups ranged from one to 30 years.

From the analysis and systematic process of data integration, the phenomenon "Collectively managing the research group for the production of scientific knowledge and training of human resources in nursing and health" was evidenced, supported by eight categories and twenty-two subcategories, which were presented in Chart 1 linked to each of the components of the paradigmatic model.

Chart 1 – Categories and subcategories of the phenomenon. Florianópolis, Santa Catarina, Brazil, 2022

Component	Category	Subcategory	
Condition	Articulating with instances of academic management	Understanding university policies	
		Having support of graduation program	
	Having structure and resources for knowledge production	Seeking financial resources	
		Having participants from different areas and levels of education	
		Having the structure	
	Developing macroprojects	Developing teaching, research and extension projects	
		Following an area of concentration and line of research	
Action and interaction	Developing knowledge management strategies	Integration strategies	
		Strategies for diffusion and sharing knowledge	
		Organizational strategies	
		Using information and communication technologies	
	Establishing national and international agreements and partnerships	Establishing partnerships	
		Stimulating internationalization activities	
		Participating in organizations and class representations	
	Managing the research group with the collective	Building bonds beyond the academic context	
		Recognizing the importance of leadership in the research group	
		Working as a team	
	Consequence	Contributing to the theoretical, scientific and technological development of the profession	Including different theoretical and methodological references
			Collaborating for the innovation of scientific knowledge
Training professionals to work in teaching			
Returning to society through extension actions		Meeting the population's health needs	
		Developing extension actions	

Source: The authors, 2022.

Conditions that induce the occurrence of the central phenomenon

In the first category, **“Articulating with instances of academic management”**, the first subcategory, “Understanding university policies”, showed the insertion of the research group in a larger context of a federal public university, which involves the Pro-Rector of Research, Nursing Department and the Nursing Graduate Program.

Associated with this structure, formed in a teaching institution, there are institutional policies that guide the actions of the people involved through guidelines, decrees and resolutions. Thus, there is an alignment of what is set by the university and the actions developed by the research group.

The research group is part of this and produces knowledge within the university, the same assumptions that we understand that the university has, they have to be there in the group. (P13)

Public universities in this country are minority. More than 80% of our country universities are private, so the public university is a fortress of thinkers. There are few universities that have a structure of thinkers as unique as the public university has, with doctors, with committed people, with people with experience abroad, with people who are researching in other places. In addition, there is this knowledge appropriation, so I think this has to be valued. (P10)

I think that now the main part will be, I believe, the department's internal policy, and that is an area that I think the academia has no idea of depth. So I think that this will be up to the professors, they are the ones who will try to solve this part, this group space within the university. We know it's not easy. (P18)

In the second subcategory, “Having support of graduation program”, a synergy between research groups and graduation program was evidenced. Graduation program provide funding, namely: scholarships for master's and doctoral students through funding agencies, the Coordination for the Improvement of Higher Education Personnel (CAPES) and the National Council for Scientific and Technological Development (CNPq); support for research professors for congresses and technical visits abroad; funding of translation fee and publication of articles in journals of extracts A1, A2 and B1, which encourages the publication of scientific articles. Moreover, they highlighted the commitment of the graduation programs to ensure compliance with the

deadlines stipulated for the qualification and defense of dissertations and theses.

I see a perfect relationship because the group is from the graduate course, it was created within the graduate program, so it has a symbiotic link with graduate programs. Both walk and work together all the time [...] that for me is already given. (P04)

The graduate program helps in publications, [...] it helps with the publication fee, the translation fee in A1, A2 and B1 journals, in these three. (P02)

In the second category, **“Having structure and resources for knowledge production”**, the first subcategory, “Seeking financial resources”, showed that, if on the one hand the research groups are within a formal structure of a university, on the other hand, they do not just rely on the institution and assume the responsibility of raising funding from sources outside the institution. One of the ways to raise funds is by submitting projects to public notices funded by agencies. To this end, researchers meet in work groups, according to research interests, formed by professors and students.

Talking of the group functioning, the professor must have funded projects to get the resources, it depends on the entrepreneurial spirit of the professor and he/she needs to have an understanding of the members. (P01)

We plan to compete for those public notices that have to do with the group's area and work groups meet to be able to build proposals for these public notices, and we are always competing in public notices. (P10)

This year there were some public notices that opened and, participating in the group, thinking about the training that I am doing, I need to be connected with the demands of the funding agencies. Therefore, demands were taken to the group and it was accepted, in this case, with my advisor. (P13)

Our focus was the construction of this building, which houses the research laboratories, in addition to the faculty rooms. We were looking forward things, deadlines, and we spoke with the engineer almost every week. (P08)

Moreover, other ways of raising financial resources are extension project workshops for the academic and external communities; payment of a monthly fee for group members. In both cases, the resources obtained are reverted to the needs of the research group or are used to help students to participate and present their work in events.

We have some difficulties, especially the funding side, but we manage to get around it with our extension projects, giving lectures, and we manage to raise money. (P02)

We offer workshops for 10 BRL for students and the community; we have a group tuition and it includes buying coffee, painting the group room that we are going to do, to buy other things like cookies and everything else. Everything we use in the group is bought with the tuition money that everyone pays. I do the control and also buy things. (P19)

The second subcategory, "Having participants from different areas and levels of education", showed a heterogeneous composition in the conformation of the research groups, with different levels of education, areas of activity and nationalities. Among them, undergraduate, master's, doctoral, specialization, residency, professional master's students; professionals from health institutions; collaborators, permanent and voluntary professor. Among these members are, besides nurses, physical educators, biologists, speech therapists, physical therapists, among others.

This is our objective, to integrate undergraduate and graduate students, nurses and other professionals who are working, who are not necessarily in the university, but the group is open to this. (P09)

We have to involve the nurse who is at the end, the nursing technician, who can participate, why not? We have to involve other professionals from other areas and we have to involve our master's, doctoral and undergraduate students. (P07)

But I believe it has a relationship with being a multiprofessional group, due to having an opening in the program, which is not just for nurses, so other professionals seek graduate studies here to do. In addition, that adds a lot, because there are different perceptions. (P09)

In the third subcategory, "Having the structure", there were advances conquered in the structure since the creation of the research groups until this moment, with spaces considered adequate. The physical structure was perceived as important as human resources, as it facilitated meetings and communication between the participants of the research group.

The group must have not only human resources, but also material ones, we already have a lot. There are conditions here, if students, master's students, doctoral students, undergraduate students need a room, there's

already a room so they can come, do their work. So, I mean, we also have these resources to offer to students or researchers or group members. So, I think it's this whole set, you know? (P09)

In the third category, "**Developing macroprojects**", the first subcategory, "Developing research and extension projects", shows that research groups have multicentric projects in Brazil and abroad, in which members are inserted to do their work. In addition to dissertations and theses projects, they are also linked to projects with the aim of adding to training, interacting and associating knowledge in the research area.

We have macroprojects and smaller projects in which students get involved, master's and doctoral students make their dissertations and theses bigger. And undergraduate students too, PIBIC. So, we usually do these projects, and then we get other people involved. (P02)

Look, you're going to be alone, so let's do another. I think this issue of side projects is innovative in our group, because that's when you can interact, isn't it? With the objectives. (P01)

The second subcategory, "Following an area of concentration and line of research", expressed the development of projects with the lines of research and the two areas of that are linked through the Nursing Graduate Program. Starting from the line of research, the investigative identity of the research group is built, which influences the training and subsequent performance of masters and doctors.

So, this is an important role for the group as well, to diversify and expand all possible methodologies. Not running away, of course, from the area of concentration, not running away from the line of research, always trying to have the line as a guide, I think the tendency is just for us to grow, improve, and strengthen the group more. (P09)

Because of this alignment, professors are worried about associating their students' research interests with their macroprojects. As for the students, there is an awareness that their research topic must be inserted in a larger context of the advisor's line of research.

I accept what the students bring of interest, which emerged from their will, from their questioning on doing such a study. Of course, but I see if it's within my macro, which is not quite a physical macro as it is being proposed today, that's within what it's here. (P08)

The line of research also influences funding, publications and demand from participants. Considering that some areas are of greater interest in science, the others have difficulty to maintain themselves. Because of this, researchers linked to these areas, considered non-priority, are interested on the subject.

So, as our group is from a line of research that is not hegemonic, which I consider not from the traditional health care model, which is a very excluded line, it does not have a priority in science. (P06)

Action and interaction

The Action and Interaction component consists of three categories and supported by ten subcategories established from the conditions. These relationships move the phenomenon.

In the first category, "Developing knowledge management strategies", the first subcategory, "Integration strategies", involves the orientation and integration strategies of the research group participants. Regarding orientation, students with a higher level of academic training, supervised by the advisor, accompany students with lower academic level. Another strategy is to share food during breaks to mediate integration. These strategies are essential to consolidate the RG.

The doctoral student who accompanies the master's student, the master's student who accompanies the undergraduate student, and we do a rotation, and the thing has to go on, and it's not just a project, it has to run in this dynamic. (P03)

Although some strategies are used, the participants suggested new actions, such as discussion groups and case studies, to promote integration.

I think you really must have discussion groups, case studies, or articles, or a theme, sit and discuss. Maybe this makes the group interact with professors and students [...]. (P12)

In the second subcategory, "Strategies for diffusion and sharing knowledge", activities aimed at teaching and research and extension were mentioned. In teaching, subjects related to the area of study of the group are given. In addition, undergraduate students take the knowledge learned in the group to the classroom, which strengthens discussions.

And that I also think is very positive. So, the fact that you have disciplines linked to the topic that the group develops brings students demands, brings the new views of theory, brings this constant update. (P01)

In sharing knowledge strategies for research and extension, the following were cited: scientific coffee to discuss topics for updating health care practice; sharing research progress; discussion of topics of interest to members; groups to prepare scientific articles; methodological instrumentalization; theoretical instrumentalization; organization of scientific events; presentation of works for dissemination of knowledge; and systematization of ideas to translate into actions.

We use brainstorming a lot during subjects, including subjects that are not related to the project I participate in, they ask a lot for the opinion of projects that are happening with other academics or with other professors there in the group, there is always this exchange of ideas, they value a lot. (P18)

The third subcategory, "Organizational strategies", showed the involvement of everyone in the organization of activities, from planning schedule, planning activities, evaluating the results achieved. Thus, they hold meetings, prepare minutes, booklet of operating projects and the group's guidelines to regulate actions.

We established a schedule of themes at the end of the year for the next year. And everyone participates in this schedule of activities and done within the group. We always take a draft, to start with an idea, and then the group adjusts what we've done. (P02)

Another strategy is to allocate participants in working groups to divide the activities of each one and keep the functioning of the research group. These working groups are responsible for scientific activities, infrastructure, integration activities, articulating activities with nursing class entities, marketing and dissemination activities, fundraising activities, participation in events and national and international cooperation.

We divided into some groups, and the work is moving on. For example, there are girls who look for scientific events and disclose them, and there is a spreadsheet that they update we access and look. There is the group that organizes the parties, the get-togethers, which must have. There is the scientific group, who wants to publish, where they will publish, how they will publish, who will

be the author. It has to organize the council, what we could do with COREN, with ABEN, things like that. (P16)

In the fourth subcategory, "Using information and communication technologies", participants mentioned the use of technologies such as email and WhatsApp as a communication strategy. As visibility strategies, websites, Facebook, and Instagram are used.

We updated the Facebook page and created an Instagram account. Many criticize the use of social networks in a sense of make explicit private life. When I think about the role of the university and the democratization of knowledge, I think that we should share more what happens in the academic environment. How many of our friends don't know about the theses and dissertations we work on, or still think that studying is an easy task, not being understood as work. So, I think that using social network is a way of giving visibility to what we do, dialoguing with more contemporary tools. And it connects people. (P13)

We also have a WhatsApp group, which is interesting, there are no unnecessary messages, but we know when someone presented work at events for example. I think it depends on the cooperation and participation of all group to get this communication right and tuned. (P16)

The second category, "**Establishing national and international agreements and partnerships**", supported by the first subcategory, "Establishing partnerships", highlights the interaction between members of the same institution, but also the interaction with other institutions and research groups that work on the same theme in the country, many of these, reference in the field of study.

I think that in the group there is a lot of partnership and that is also very positive. There is the master's student who is working on a certain subject, which the doctoral student also works on, so he invites him to participate in the panel. This doctoral student, he will contribute, later they will produce together, and I think this is very productive. (P12)

We have partnerships between the group professors, now I am using a theoretical framework in one of the theses that is used a lot by another professor, and she helps, participates in the panel, helped us to instrumentalize theoretically. So it's very interesting, I like it a lot. (P05)

In the second subcategory, "Stimulating internationalization activities", the participants mentioned stimulating

sandwich doctorates, publications with international authors, participation in congresses and visits abroad. In addition to sending researchers for internationalization activities, they receive researchers for the same purposes.

In the internationalization policy, we stimulate the presentation of works in international events, sandwich doctorate, qualified scientific production with the advisor, stimulus to A1 production. And we have received foreign professors who come to see our work, talk about their work, make an exchange. (P09)

In the third category, "**Managing the research group with the collective**", the first subcategory, "Building bonds beyond the academic context", pointed out the importance of building bonds beyond the academic context. As many come from other cities and do not have a local support network, research group colleagues become the closest people. Thus, the participants of the research group get closer for work and take these relationships into their personal lives.

Besides the professional contact generated in this group, we believe a lot in humanization and love, and we try to care about the friend as a whole and not just as a research member, as a friend. (P15)

The group is a gateway for us researchers. It is there that we have a more intimate, closer interaction with colleagues and with the advisor. This is fundamental for the development of the research. And in these research groups we have a lot of growth. It's really full of love and interaction. (P15)

You call someone to do something with you, and friendship is born, which can be a friendship just for work or it can be for life. (P16)

In the second subcategory, "Recognizing the importance of leadership in the research group", leadership was seen as the guide, it is the people who lead, organize and articulate, they are visionary and idealizing professors.

I think that leadership is what gives the tone of the group, just as I think that the tone of a health care unit has to do with its manager. (P01)

I think it must have a broader view of what we want to achieve, I think you have to have a very good organization, be aware of everything that is happening, control it to be able to even ask, look and see where the doubt or what you need to improve. (P07)

Although leadership was highlighted as important in an RG, in the third subcategory, "Working as a team",

participants recognized participative management, in which everyone was able to express their opinions to improve the management process.

I see a process of shared management, in which everyone, within the possibilities, participates in what they are most interested in. And then we organize it in the moments we have together in the group. (P13)

In a group that sees itself as dialogical, purposeful, where you need to be critical, then I realize that this is also my role. So I understand that it is my function in the group, I cannot wait for the group leader, or the deputy leader or the other researchers to bring this ready and just keep waiting. (P13)

Leadership, it involves understanding the group as a whole, but they are all leaders, they are all strong researchers who, of course, only enrich our group. I don't work alone, in fact, the only thing I do is not work alone, we work in a group. (P05)

Consequence

The Consequence component consists of two categories and five subcategories which express the results from the condition, action, and interaction components to highlight the phenomenon. That is, the two previous components lead to a consequence.

In the category “**Contributing to the theoretical, scientific and technological development of the profession**”, the first subcategory, “Including different theoretical and methodological references”, highlights the use of different research methods, including qualitative, quantitative, and mixed methods. As for the theoretical references, the groups adopt different references according to the research theme.

I work a lot with qualitative research, but I'm also interested in quantitative research. I think this is a fundamental role for the group, it has to expand knowledge, but also work methodologies. (P09)

In the second subcategory, “Collaborating for the innovation of scientific knowledge”, the development of technologies and innovations was assigned to the preparation of dissertations and theses, as well as innovative publications for science. Despite already developing actions in this sense, the concern with the evolution of science is still emerging.

Today we work with educational technologies, which is an aspect of pedagogical strategies that help in student

development. [...] Today we also have a very strong line of technology within the group, mixing education with technology, which I think is the “boom” of the moment. (P15)

Research, in our country, is always placed in a subliminal way in everything. Education in the country is placed in a subliminal way. So the feeling you have, sometimes, is that you are not making progress, but when we stop, look at everything we are doing, how much transformation has already done in people's lives, in the teaching and learning process. We realize that there is the result of all our work. (P10)

In the third subcategory, “Training professionals to work in teaching”, the training of qualified professionals from Brazil to work in health and nursing was addressed, with some initiatives such as the Interinstitutional Master's and Doctorate.

For all these years that I've followed the group, I've noticed that it has a very good insertion in the country's education. And, regarding research, theses and dissertations, it is also a very embracing group, it already had people who participated as advisees here from all over Brazil. And this ends up sowing some questions throughout Brazil. (P10)

In the second category, “**Returning to society through extension actions**”, in the first subcategory, “Meeting the population's health needs”, the members reported their concern to meet society's research demands and meet improvements and innovations aimed at population's health.

The objective of the group is to study, to have extension, to serve society, to improve the service provided to a specific area. (P07)

Research needs to have a social return, so the person, in addition to wanting to research, investigate, must want this to return to his/her community in actions to improve this community. (P10)

The second subcategory, “Developing extension actions”, demonstrated the extension projects aimed at meeting a certain health situation in society, providing return, a social return, and reaffirming the commitment of the research groups to the collective.

Figure 1 shows the connection between categories and subcategories and highlights the phenomenon. The categories presented in the condition and action-interaction components were highlighted with primary colors, which suggest the basis of the phenomenon. When these two colors (red and yellow) diffuse, a secondary color (orange) appears, which represents the result of this diffusion. In other words,

conditions, actions, and interactions are vital to generate consequences, and the three components together move

the phenomenon. Therefore, the dotted lines and the arrows around it suggest the idea of movement.

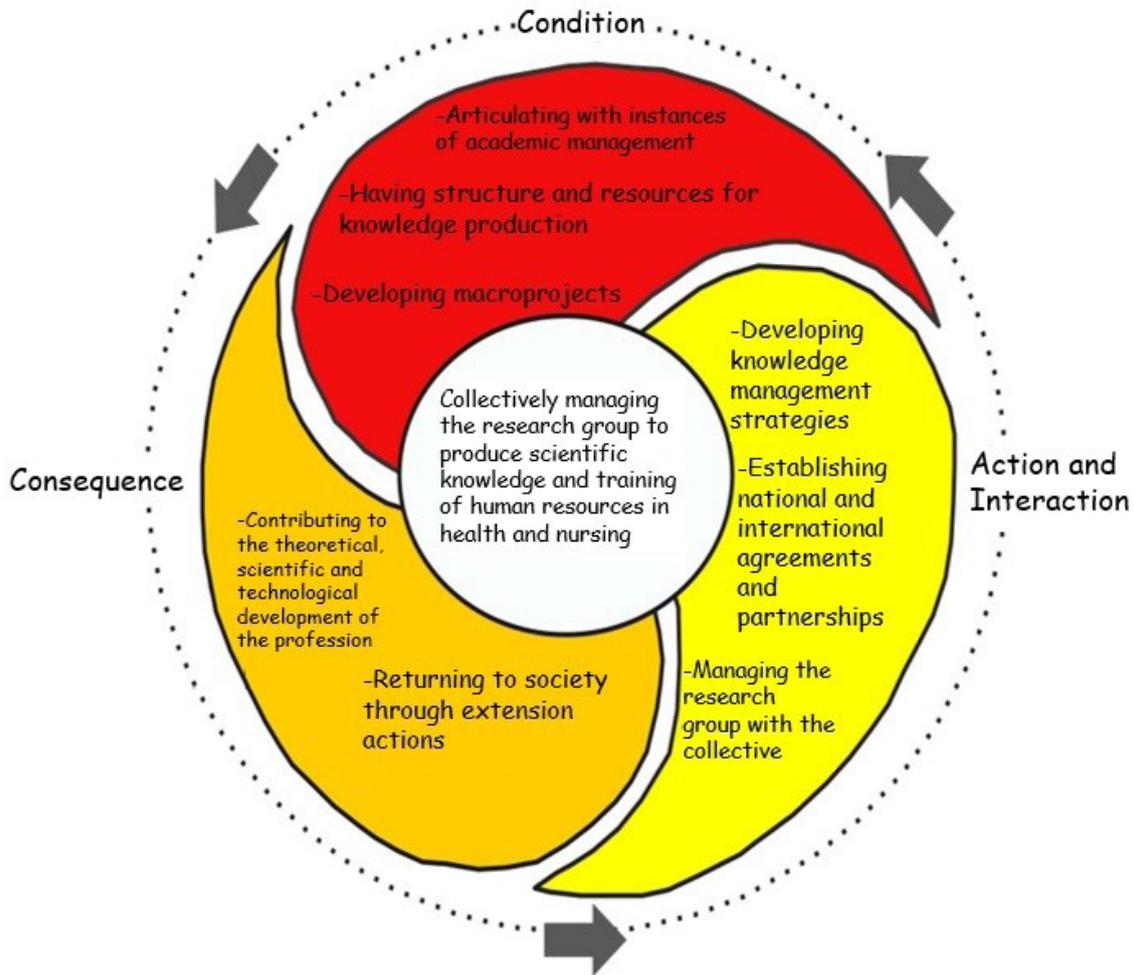


Figure 1 – Theoretical model of research groups management. Florianópolis, Santa Catarina, Brazil, 2022
Source: The authors, 2022.

DISCUSSION

Similar to what was shown in this research, the infrastructure was pointed out by teaching nurses of the *stricto sensu* nursing postgraduate programs at public institutions as directly related to the quality of teaching work. Since the lack of structure and also of supplies and equipment does not favor concentration in the workplace and allows professors to improvise the necessary resources in an attempt to try to supply them, which can affect the worker’s own health, being one of the predictors of illness at work⁽⁹⁾.

In addition to infrastructure, knowledge management strategies can be the best practices in research groups. Among the knowledge dissemination and sharing strategies, sharing research projects, discussing the progress of the study,

provides a practice related to the conversion of tacit-tacit knowledge. Another strategy of sharing knowledge is the organization and presentation of papers at events, a more common practice in research groups that facilitates the exchange of information in the tacit-tacit conversion model, but there is also externalization with explicit-tacit knowledge⁽¹⁰⁾.

Before moving on to the next strategies, it is important to differentiate the concepts of explicit knowledge and tacit knowledge. The first is mathematical knowledge, codified, articulated, and stored in a way that can be accessed in a sharing network. While tacit knowledge comes from particular experiences, this type of knowledge is difficult to articulate and store, it is transmitted informally in personal contacts⁽¹¹⁾.

Among the organizational strategies, holding meetings and joining participants in work groups are also evidenced

in the literature as best practices in research groups. Forming work groups with the same interests expands the search and sharing of knowledge in the tacit-tacit or shared modality. Although research groups have these strategies, they can expand their techniques, such as, for example, registering documents for the dissemination of articles, theses, presentations, that is, a repository that stores the main vital works for the socialization of knowledge in the field of study⁽¹⁰⁾.

Moreover, they develop other strategies little explored in the literature associated with research groups, such as, for example, the monitoring of students with a higher level of academic training towards students with lower level, as a practice of orientation and integration of students. Among the sharing strategies, brainstorming and the systematization of ideas are not described in the literature. And among the organizational strategies, the booklet and the group's guidelines are not common practices among research groups.

As for the establishment of national and international agreements and partnerships, a study conducted in four Norwegian universities, in order to verify the collaboration in a network of research groups, identified that in the health area only 7% of the researches had been developed isolated; 5% in an international network; 11% had informal collaboration; 16%, with none of the alternatives; 19%, with a formal/informal research group and an international network; and 42%, with a formal research group. The study concluded that members of groups participating in international research networks can increase the productivity and quality of publications. However, this should be a complementary strategy and not the only one adopted by researchers⁽¹²⁾.

In this perspective, there are initiatives in the literature that aim to make a strong partnership network between researchers and community stakeholders (patients, community organizations, professionals, policy makers), working collaboratively in research development. However, these processes are complex and require the establishment of strong partnerships and the commitment of all participants. This strategy can contribute to the development of successful research, representing an impact for all participants⁽¹³⁾.

Regarding management, this theme has undergone changes over the years, with a tendency to change the way people are managed in organizations. With technological development associated with the search for greater quality and productivity, organizational processes tend to adopt more flexible models and enable the sharing of decision-making⁽⁶⁾.

In this context, a new concept of "managing with people" emerges, which means incorporating these internal partners in the management of organizations, that is, it consists of a change in the way people are noticed. They become active and fundamental subjects in decision-making processes,

with actions aimed at creating innovation and enabling the exercise of knowledge⁽¹⁴⁾. Although these concepts are mainly linked to the organization of companies in the productive sector, they may easily be associated with the management of people in research groups.

People management is an ally for achieving the objectives of institutions. People are no longer seen as human resources and are now seen as partners, considering their history and personality. After all, they are the ones who maintain the organizations, work, lead, act, execute and improve their activities⁽¹⁴⁾.

For greater integration and approximation of researchers to develop their activities together, building bonds beyond the academic context is considered one of the management processes. This strategy is considered good practice for knowledge management in research groups and consists of moments outside the research group and the workplace, which favors socializing through tacit-tacit conversion⁽¹⁰⁾.

As shown in the results on the leader's role in research groups, they corroborate the findings in the literature by evidencing leadership with a role of placing the group in the social and scientific context to obtain visibility, legitimacy, and reputation. The leader's performance as a highly committed researcher impacts on a better performance in research groups, since these professionals provide the appropriate organizational means for other researchers.

Regarding contributions to the theoretical, scientific and technological development of the profession, a study conducted in a similar scenario showed that the training of nurses in these spaces strengthens both teaching and research and, consequently, the health care area. Scientific productions, a strong characteristic of academic training, give greater visibility to the profession and build its practices, improving quality and making it more reflective and innovative. In addition, they promote the improvement of nurses and disseminate scientific knowledge⁽¹⁵⁾.

■ FINAL CONSIDERATIONS

Research activities in the academic context are linked to research groups, which need human, material and financial resources to develop their research. These conditions require management strategies and national and international interactions in research groups that result in theoretical, scientific, and technological development of the profession and social return. In addition, the management of the research groups is shared among the participants.

The groups develop knowledge management strategies such as: sharing research projects, presenting work at events, meetings, working groups, establishing partnerships and people management, considered good practices for research

groups. Additionally, practices such as brainstorming, booklet, and internal guidelines have been identified, which are still underexplored in the literature within this study setting.

As a limitation, it is emphasized that the presented results reflect the context of research groups linked to a specific Graduate Program, requiring further investigations in other settings in order to broaden the understanding of the investigated phenomenon.

Finally, the development of a theoretical model for the management of research groups can serve as a guide for graduate programs in nursing and health for planning the work process of researchers associated with the group. In this way, they can contribute with research of great impact for society.

■ REFERENCES

- Erdmann AL, Peiter CC, Lanzoni GMM. Brazilian research groups in nursing: comparison of 2006 and 2016 profiles. *Rev Gaúcha Enferm.* 2017;38(2):e69051. doi: <http://doi.org/10.1590/1983-1447.2017.02.69051>
- On behalf of the GBM Young Investigators; Hennig J, Feige MJ. Highlight: young research groups in Germany. *Biol Chem.* 2019;400(7):811-2. doi: <https://doi.org/10.1515/hsz-2019-0246>
- Nyström ME, Karlun J, Keller C, Anderson Gäre B. Collaborative and partnership research for improvement of health and social services: researcher's experiences from 20 projects. *Health Res Policy Syst.* 2018;16(1):46. doi: <http://doi.org/10.1186/s12961-018-0322-0>
- Ministério da Ciência, Tecnologia e Inovação (BR). Conselho Nacional de Desenvolvimento Científico e Tecnológico [Internet]. Diretório dos Grupos de Pesquisa no Brasil. Brasília, DF: Ministério da Ciência, Tecnologia e Inovação; 2017. [cited 2022 Jul 07]. Available from: <http://lattes.cnpq.br/web/dgp>
- Cook I, Grange S, Eyre-Walker A. Research groups: how big should they be? *PeerJ.* 2015:e989. doi: <http://doi.org/10.7717/peerj.989>
- Verbree M, Horlings E, Groenewegen P, Weijden IV, van den Besselaar P. Organizational factors influencing scholarly performance: a multivariate study of biomedical research groups. *Scientometrics.* 2014;102(1):25-49. doi: <http://doi.org/10.1007/s11192-014-1437-x>
- Corbin J, Strauss A. *Basics of qualitative research: techniques and procedures for developing grounded theory.* California: SAGE; 2015.
- Santos JLG, Erdmann AL, Sousa FGM, Lanzoni GMM, Melo ALSF, Leite JL. Methodological perspectives in the use of grounded theory in nursing and health research. *Esc Anna Nery.* 2016;20(3):e20160056. doi: <http://doi.org/10.5935/1414-8145.20160056>
- Bublitz S, Beck CLC, Silva RM, Dal Pai D, Camponogara S. Risks of illness of nursing professors working in in post-graduation courses. *Rev Gaúcha Enferm.* 2021;42:e20190514. doi: <https://doi.org/10.1590/1983-1447.2021.20190514>
- Lima KK, Amaral DC. Práticas de gestão do conhecimento em grupos de pesquisa da rede Instituto Fábrica do Milênio. *Gest Prod.* 2008;15(2):291-305. doi: <http://doi.org/10.1590/s0104-530x2008000200007>
- Dagenais C, Dupont D, Brière FN, Mena D, Yale-Soulière G, Sween-Cadieux EM. Codifying explicit and tacit practitioner knowledge in community social pediatrics organizations: evaluation of the first step of knowledge transfer strategy. *Eval Program Plann.* 2020;79:101778. doi: <https://doi.org/10.1016/j.evalprogplan.2020.101778>
- Kyvik S, Reymert I. Research collaboration in groups and networks: differences across academic fields. *Scientometrics.* 2017;113(2):951-67. doi: <http://doi.org/10.1007/s11192-017-2497-5>
- Hoekstra F, Ginis KAM, Allan V, Kothari A, Gainfort HL. Evaluating the impact of a network of research partnerships: a longitudinal multiple case study protocol. *Health Res Policy Syst.* 2018;16(1):107. doi: <http://doi.org/10.1186/s12961-018-0377-y>
- Ribeiro AL. *Gestão de pessoas.* 2. ed. São Paulo: Saraiva; 2012.
- Silva FJ, Ratier APP, FelliVEA, Tito RS, Baptista PCP. A formação de pesquisadores na temática da saúde do trabalhador de enfermagem. *Enferm Foco.* 2017;8(3):40-4. doi: <https://doi.org/10.21675/2357-707X.2017.v8.n3.1322>

■ **Acknowledgments:**

This study was conducted with the support of the National Council for Scientific and Technological Development (*Conselho Nacional de Desenvolvimento Científico e Tecnológico* - CNPQ) through the master's scholarship and research productivity scholarship.

■ **Authorship contribution:**

Project administration: Greici Capellari Fabrizzio.
Formal analysis: Greici Capellari Fabrizzio, José Luís Guedes dos Santos.
Conceptualization: Greici Capellari Fabrizzio, José Luís Guedes dos Santos, Alacoque Lorenzini Erdmann.
Data curation: Greici Capellari Fabrizzio, José Luís Guedes dos Santos, Alacoque Lorenzini Erdmann.
Writing-original draft: Greici Capellari Fabrizzio.
Writing-review & editing: Greici Capellari Fabrizzio, José Luís Guedes dos Santos, Alacoque Lorenzini Erdmann.
Investigation: Greici Capellari Fabrizzio, José Luís Guedes dos Santos, Alacoque Lorenzini Erdmann.
Methodology: Greici Capellari Fabrizzio, José Luís Guedes dos Santos.
Funding acquisition:
Software: Greici Capellari Fabrizzio, José Luís Guedes dos Santos.
Supervision: José Luís Guedes dos Santos, Alacoque Lorenzini Erdmann.
Validation: José Luís Guedes dos Santos, Alacoque Lorenzini Erdmann.
Visualization: Greici Capellari Fabrizzio, José Luís Guedes dos Santos, Alacoque Lorenzini Erdmann.

The authors declare that there is no conflict of interest.

■ **Corresponding author:**

Greici Capellari Fabrizzio
E-mail: greicicapellari@gmail.com

Received: 08.08.2022
Approved: 02.06.2023

Associate editor:

Helena Becker Issi

Editor-in-chief:

João Lucas Campos de Oliveira