

## **ACADEMIC GRADUATE PROGRAM IN NURSING AT UFSC: TECHNOLOGICAL, POLITICAL, SOCIAL AND ECONOMIC IMPACTS**

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### **ABSTRACT**

**Objective:** to discuss the different impacts - technological, political, social and economic - of Graduate Program in Nursing at the *Universidade Federal de Santa Catarina*, problematizing their indicators and their adequacy to the field of Nursing and Health, according to the genesis and nature of Nursing care, the Nursing science and its interfaces with other fields of knowledge.

**Method:** a study conducted in July 2021 based on documentary sources extracted from an institutional form, for evaluating graduates and annual reports of the Program in the period between 2011 and 2020. The documentary data were submitted to descriptive analysis.

**Results:** the technological, political, social and economic impacts and their respective indicators are presented as proposed by the Coordination for the Improvement of Higher Level Personnel for the evaluation of graduate programs. The evaluation of the impacts of graduate education in Nursing indicated that it represents a challenge to be faced, given the difficulties identifying quantitative and qualitative evidence allowing such verification.

**Conclusion:** important impacts of the Program are evidenced; however, the indicators and respective criteria are questioned regarding the best adequacy and completeness to the field of Nursing and Health, according to the genesis and nature of Nursing care, the Nursing science and interfaces with the other fields of knowledge. Therefore, it is urgent to invest in studies and to propose indicators and criteria to evidence the real impact of the Graduate Programs in Nursing on society.

**DESCRIPTORS:** Graduate education. Nursing. Public policies in education. Research in Nursing. Diffusion of innovations. Nursing assessment research.

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## PROGRAMA ACADÊMICO DE PÓS-GRADUAÇÃO EM ENFERMAGEM DA UFSC: IMPACTOS TECNOLÓGICOS, POLÍTICOS, SOCIAIS E ECONÔMICOS

### RESUMO

**Objetivo:** discutir os diferentes impactos - tecnológicos, políticos, sociais e econômicos do Programa de pós-graduação em Enfermagem da Universidade Federal de Santa Catarina, problematizando seus indicadores e sua adequação ao campo da enfermagem e saúde, segundo a gênese e a natureza do cuidado de enfermagem, da ciência da enfermagem e suas interfaces com os demais campos de conhecimento.

**Método:** estudo realizado em julho de 2021 a partir de fontes documentais extraídas de formulário institucional, de avaliação de egressos e de relatórios anuais do Programa, no período entre 2011 a 2020. Os dados documentais foram submetidos à análise descritiva.

**Resultados:** são apresentados impactos tecnológico, político, social e econômico e seus respectivos indicadores conforme proposto pela Coordenação de Aperfeiçoamento de Pessoal de Nível Superior para avaliação de programas de pós-graduação. A avaliação dos impactos da pós-graduação em enfermagem apontou que a mesma se constitui em um desafio a ser enfrentado, haja vista as dificuldades de identificar evidências, quantitativas e qualitativas, que permitam a sua constatação.

**Conclusão:** evidencia-se impactos importantes do Programa, todavia, questionam-se os indicadores e respectivos critérios quanto a melhor adequação e completude ao campo da enfermagem e saúde, segundo a gênese e natureza do cuidado de enfermagem, da ciência da enfermagem e interfaces com os demais campos de conhecimentos. Portanto, é premente investir em estudos e proposição de indicadores e critérios para evidenciar o real impacto dos Programas de Pós-Graduação em Enfermagem na sociedade.

**DESCRITORES:** Educação de pós-graduação. Enfermagem. Políticas públicas em educação. Pesquisa em enfermagem. Difusão de inovações. Pesquisa em avaliação de enfermagem.

## PROGRAMA ACADÊMICO DE POSGRADO EN ENFERMERÍA DE LA UFSC: IMPACTOS TECNOLÓGICOS, POLÍTICOS, SOCIALES Y ECONÓMICOS

### RESUMEN

**Objetivo:** discutir los diferentes impactos, tecnológicos, políticos, sociales y económicos del Programa de Posgrado en Enfermería de la *Universidad Federal de Santa Catarina*, problematizando sus indicadores y su adecuación al campo de la enfermería y la salud, de acuerdo con la génesis y naturaleza del cuidado de enfermería, la ciencia de la enfermería y la interacción con otros campos del conocimiento.

**Método:** estudio realizado en julio de 2021 a partir de fuentes documentales extraídas del formulario institucional, de la evaluación de egresados e de informes anuales del Programa, del período 2011-2020. Los datos documentales fueron sometidos a análisis descriptivo.

**Resultados:** se presentan los impactos tecnológicos, políticos, sociales y económicos y los respectivos indicadores, propuestos por la *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*, para evaluar los programas de posgrado. La evaluación de los impactos de los cursos de posgrado en enfermería indicó que la evaluación en sí misma es un desafío, dadas las dificultades para identificar evidencias cuantitativas y cualitativas que permitan su verificación.

**Conclusión:** hay evidencias de que el Programa tiene impactos importantes, sin embargo, se cuestionan los indicadores y sus respectivos criterios para evaluar cuál es la mejor adecuación e integridad al campo de la enfermería y la salud, de acuerdo con la génesis y naturaleza del cuidado de enfermería, de la ciencia de enfermería y la interacción con otros campos del conocimiento. Por ello, es imperioso invertir en estudios y proponer indicadores y criterios para poner de manifiesto el impacto real de los Programas de Posgrado en Enfermería en la sociedad.

**DESCRIPTORES:** Educación de posgrado. Enfermería. Políticas públicas en educación. Investigación en enfermería. Difusión de las innovaciones. Investigación en evaluación de enfermería.

## INTRODUCTION

*Stricto sensu* training in Nursing represents an important strategy for consolidating the body of disciplinary knowledge and recognition of the Nursing science. The advances identified in recent decades in Brazil, represented by the expansion in the offer of Master's and PhD courses in Nursing, are evidenced not only in the increase of Master's and PhD degrees, but also in the significant expansion in the scientific and technological production, as well as the impacts on the training of professional nurses and on the adoption of best practices in health care<sup>1-2</sup>. The Graduate Programs in Nursing (*Programas de Pós-graduação em Enfermagem*, PPGEnf) are the most powerful spaces for this production and promotion of advances in health care for society<sup>3</sup>.

However, in addition to the expansion of scientific production, already identified, it is also necessary to advance in its incorporation into the professional field and with professionals with increasingly better qualifications, so that Nursing care is guided by scientifically based knowledge, in addition to complying with the technological advances and innovations. The effective translation of knowledge, from its theoretical and philosophical bases to the generation of advanced technologies and innovation, either registered or not as open or freely adopted products, is an undisputed requirement for this purpose.

The Coordination for the Improvement of Higher Level Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*, CAPES), an agency belonging to the Ministry of Education responsible for evaluating and monitoring graduate programs in Brazil, in line with the global development policies, has been highlighting the impact of this training in the professional context from different fields of knowledge and practices. For CAPES, technological, political, social and economic impacts are expected, proposing metrics to verify them. However, these impacts are related to the nature of the field of knowledge and the social practices to which they are intended, which will be expressed differently in the various fields of knowledge<sup>2</sup>.

For the CAPES Nursing Area, identifying the impacts determined by the process of training Masters and PhDs is a necessary action to recognize the contribution of this process in the qualification of the professional practices, in their different contexts of action. In this sense, it considers important to follow-up graduates by means of the graduate programs, in order to identify the professional insertion and nucleation produced by them; to follow-up on the results of their research studies, funding obtained, inclusion in Graduate Programs and in the labor market, and guidance of students at different education levels, among other relevant activities<sup>2</sup>.

Therefore, we are faced with the challenge of better expressing the understanding of our study object and professional practice, the identity of the profession and Nursing science as a singular social practice relevant to the health and life of citizens, and thus better sustaining it in the context of other sciences and professions in society.

The indicators and criteria corresponding to the impacts of *stricto sensu* training in the Nursing area signal us specificities and peculiarities in fields of subjectivities and intersubjectivities specific to our discipline<sup>4</sup>. Care as a social good and inherent to the domain of human nature involves the sensitive relationships of human and social interactions. The diversity regarding ways of life and living processes finds in health the mediation and possibilities of domains of the vitalities that promote and sustain living, ethics and the meaning of life, as well as the very construction of human civility and of a society with better living conditions and more dignity and solidarity.

Thus, this study aims at discussing the different impacts - technological, political, social and economic – of Graduate Program in Nursing at the *Universidade Federal de Santa Catarina*, problematizing their indicators and their adequacy to the field of Nursing and Health, according to the genesis and nature of Nursing care, the Nursing science and its interfaces with the other fields of knowledge. It is understood that in such impacts are included the adjacent or complementary aspects, such as the impact on the advancement of science, education, culture and organizational management, among others.

## METHOD

This is a documentary study, with a quantitative-qualitative approach. The study context was the Academic Graduate Program in Nursing (*Pós-Graduação em Enfermagem*, PEN) of *Universidade Federal de Santa Catarina* (UFSC), which reached grade 6 in the last two CAPES evaluation periods (2010-2012 and 2013-2016)\*. It was created in 1976, with the Master's Degree Course in Nursing Science: Area of Concentration (AC) in Adults Health. It started to offer the PhD Course in Nursing Philosophy in 1993. In 2021, when celebrating its 45 years, it is structured in two Areas of Concentration - AC: 1) Philosophy and Care in Health and Nursing, and 2) Education and Work in Health and Nursing.

Data collection was conducted in July 2021 from the following documentary sources:

- PEN/UFSC annual reports, forwarded to CAPES through the Sucupira platform.
- Institutional evaluation report of the graduates from 2011 to 2020: this is an online survey carried out by the Coordination of PEN/UFSC, via the Google Forms® platform, with characterization questions and about professional performance, the impact of training on professional life and mean monthly income, among other information.

The institutional form for monitoring the graduates is an online questionnaire, made available via the Google Forms® platform, containing characterization questions and multiple choice questions about professional performance, the impact of training on professional life and mean monthly income, among other information. The graduates were invited to participate in the process through email, telephone and social networks.

In this study, it was decided to consider the time frame between 2011 and 2020, which corresponds to the CAPES recommendation for monitoring graduates and their potential in the nucleating activity in the last 10 years<sup>5</sup>. Thus, of a total of 470 graduates from 2011 to 2020, 350 (74%) answered the questionnaire, 147 of which are from the PhD course, 172 from the Master's degree course and 31 from the post-PhD internship. The percentage of 74% of the responding graduates can be considered an expressive and significant figure, considering that a number of studies<sup>6-7</sup> evidence that the response rates of questionnaires/instruments sent by e-mail traditionally remain in the range of 25% to 30%. However, this rate can be improved and reach up to 60% to 70% with follow-up reminders and the use of different dissemination strategies, as pointed out by some authors<sup>7</sup>. The documentary data were submitted to descriptive analysis and presented as tables when pertinent.

This study does not require submission to the Research Ethics Committee. It was developed in line with Resolution N°. 510 of the National Health Council, which regulates research studies that use publicly accessible information and based on databases, whose information is aggregated, without any possibility for individual identification.

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\*Quadrennial Evaluation – CAPES. 2017. Available in: <https://sucupira.capes.gov.br/sucupira/public/consultas/avaliacao/consultaFichaAvaliacao.jsf>

## RESULTS

### Technological impact

According to the Nursing Area Document - CAPES, technology is understood as the application of scientific knowledge for practical purposes in any field and this includes methods, techniques and instrumentation. Innovation is conceptually understood as a result of the introduction of new knowledge or an economically and socially useful technology. Technologies and innovations are expressed in products, technological processes and services that are completely new or improved significantly. An innovation is considered implemented if it is applied to the social practice or if it is used within a productive process or certain services. For the Nursing Area/CAPES, technological incorporation and innovation can directly contribute to quality of life, care effectiveness and availability of new care techniques and equipment, thus promoting healthy living for individuals and collective groups<sup>2</sup>.

PEN/UFSC is configured as an academic program, centered on the production of theoretical and philosophical knowledge; however, it has also contributed to the production of technologies in the field of Health and Nursing, which can be expressed (in part, as the program has several other products that are characterized as technologies and that are advocated or also published as “open” technologies for free access and use) by patents already granted or in the process of obtaining registration, obtained from studies developed by students and professors of the PPG. Since 2014, it includes twelve records, as shown in Chart 1.

### Political impact

The political impact of the graduate programs is understood as the qualification of Nursing and Health professionals to act in strategic and leadership positions, with participation in the elaboration and implementation of public health policies at regional, national and international levels, as well as generation of processes and products that contribute to the efficiency of Nursing care and health management in the workplace. The political impact indicator for a graduate program in the Nursing Area must be evaluated by the gradual percentage, that is, the short-, medium- and long-term insertion of graduates, students and professors in strategic and leadership positions in the various health, management and education sectors, guiding or influencing the response to social and health needs<sup>2</sup>.

During the study period, the PEN/UFSC graduates reported that they hold positions in teaching (44.51%) and in care (34.39%). In management and coordination positions, we only found 6.94%. (Table 1)

In the institutional document for evaluation of the graduates, two questions addressed the impact of graduate training (Master's or PhD degrees). From the total of 470 graduates, 290 answered these questions. In the first, it was asked if the graduates achieved improvements/greater recognition in their professional life (head position, leadership, support scholarship, financial gratification), and there was a successful result of 237 (81.7%) positive answers. In the second, the graduates were asked to answer on an intensity scale from 0 (=nothing) to 4 (=a lot) to what extent the academic degree obtained in the PEN contributed to the performance of their current professional activities. The results evidenced that, for 245 (84.4%), the contribution was significant, that is, a lot (181 – 62.4% - intensity 4 and 64 – 22.1% with intensity 3).

**Chart 1** – Patents registered or requested – PEN/UFSC, Florianópolis, SC, Brazil, 2021.

Year	Title/Purpose	Authors
2014	PRAXIS	Jorge Lorenzetti, Francine Lima Gelbcke, Jaçany Aparecida Borges Prudente
2015	<i>Registro Eletrônico de Fisioterapia para Terapia Intensiva – REFITI</i>	Nayala Lirio Gomes Gazola, Grace T. Marcon Dal Sasso
2016	SG-COT	Maria de Lourdes de Souza, Bernardo Panerai Velloso, Carlos Alberto Leal da Costa, Tiago Burgardt
2016	<i>Observatório Analítico CTSC - Evaluation of Therapeutic Communities</i>	Maria de Lourdes de Souza e Bernardo Panerai Velloso
2016	“m-OVADOR” computer program	Ana Graziela Alvarez, Grace Dal Sasso
2016	BIO-COT - Facial biometry and control of individuals welcomed in Therapeutic Communities	Maria de Lourdes de Souza, Bernardo Panerai Velloso
2016	<i>Rede Mater</i> - Correcting maternal death records, with electronic alerts on risks and avoidability	Maria de Lourdes de Souza
2016	Telenursing to monitor child growth and development based on the International Classification of Nursing Practice (ICNP®)	Francis Tourinho, Cilene Dantas, Viviane Euzebia Pereira Santos, Ricardo Valentim
2016	<i>SIQEnf - Sistema de Indicadores de Qualidade em Enfermagem</i>	Camila Santos Pires Lima, Sayonara de Fatima Faria Barbosa, Claudio Lima
2019	<i>SISPRAD – Sistema de Proteção Radiológica</i>	Andrea Huhn, Mara Ambrosina Vargas
2019	Nursing Sizing	Inácio Alberto Pereira Costa, Maria de Lourdes de Souza
2019	Neonatal Skin Safe	Roberta Costa, Simone Vidal Santos, Flávia Regina Souza Ramos

**Table 1** – PEN/UFSC graduates, according to professional activity. Florianópolis, SC, Brazil, 2021. (n=350)

Professional activity	N	%
Teaching	154	44
Care	119	34
Student (master’s case)	25	7,14
Management/Coordination	24	6,86
No activity (retired, unemployed)	12	3,42
Teaching and care	7	2,2
Advice/Counseling	5	1,43
No answer	4	1,15
<b>Total</b>	<b>350</b>	<b>100</b>

## Social impact

Training qualified human resources to act in a proactive and integrated way in society and in the improvement of public management and the reduction of the social debt, as well as for the training of a population that makes use of the science and knowledge resources resulting from research studies, consists in the expected social impact of a PPG. Services and assistance to the community are included in this field, developed with the effective participation of teachers and students of the Program, aiming for solutions and/or responses to situations emerging from the daily practice in the health institutions in the context of the SUS, teaching, and the challenges of the actions related to the steps for the implementation of public policies<sup>2</sup>.

PEN/UFSC has contributed for training qualified human resources of Brazilian nurses, from different regions, Latin America and countries from other regions, at different levels: Master's, PhD and post-PhD internships. Until December 2020, PEN/UFSC had awarded 805 Master's and 404 PhD degrees and certified 75 post-PhDs, from different Brazilian regions, as well as internationally. This training took place both in regular classes at the headquarters, as well as in the interinstitutional modality\*\*.

With regard to international insertion, PEN/UFSC awarded 40 Master's, 16 PhDs and 08 post-PhD degrees. (Table 2)

**Table 2** – Number of PEN/UFSC graduates, according to country of origin – 1976-2020. Florianópolis, SC, Brazil, 2021.

Country	Master's degree	PhD	Post-PhD
Angola	3	–	–
Argentina	1	–	–
Chile	20	2	–
Colombia	–	4	–
Costa Rica	2	1	1
Ecuador	1	–	–
Spain	–	–	5
Mexico	–	–	1
Pakistan	–	2	–
Peru	7	4	–
Portugal	4	–	1
Uruguay	–	1	–
<b>Total</b>	<b>38</b>	<b>14</b>	<b>8</b>

At the international level, it is worth highlighting the initiative to train twenty Chilean nurses, in the modality of an International Interinstitutional Master's degree course, with *Universidad de Magallanes* - Chile, this being the first course of this nature implemented in the Nursing Area in Brazil, as well as in its own institution (UFSC), together with the Dean Office of Graduate Studies.

In the national context, PEN was the first program in the Nursing area to propose and develop training initiatives in interinstitutional partnerships. The extramural offer model was initiated with the creation of the Nursing Promotion Network in the South Region (*Rede de Promoção da Enfermagem da Região Sul*, REPENSUL), a partnership between federal higher education institutions from the

\*\*Report PEN / UFSC - Sucupira Platform. 2020. Available at: <https://sucupira.capes.gov.br/sucupira/public/index.xhtml>

Brazilian South Region, with the implementation of expanded master's degree courses (1993) and, from then on, through the CAPES policy of offering Interinstitutional PhD (*Doutorado Interinstitucional*, DINTER) and Interinstitutional Master's (*Mestrado Interinstitucional*, MINTER) courses. PEN has already offered three Interinstitutional PhD and sixteen Interinstitutional Masters classes (Chart 2)

**Chart 2** – Total number of graduates from the DINTER and MINTER courses, according to year and receiving educational institution. PEN/UFSC, Florianópolis, SC, Brazil, 2021.

Year	Receiving Higher Education Institution	No. of graduates
<b>Interinstitutional PhD - DINTER</b>		
2007-2011	<i>Universidade Federal do Pará</i>	10
2013-2015	<i>Universidade Federal do Rio Grande do Norte</i>	14
2015-2019	<i>Universidade do Estado do Amazonas</i>	16
<b>Total</b>		<b>40</b>
<b>Interinstitutional Master's - MINTER</b>		
1993	<i>Universidade Federal do Paraná</i>	12
	<i>Fundação Universidade Federal do Rio Grande/ Universidade Federal de Pelotas</i>	10
	<i>Universidade Federal de Santa Maria</i>	6
1994	<i>Universidade do Vale do Itajaí</i>	16
1995	<i>Universidade Federal do Rio Grande do Sul</i>	9
1996	<i>Universidade Federal de Mato Grosso</i>	12
	<i>Fundação Universidade Federal de Rio Grande/ Universidade Federal de Pelotas</i>	16
	<i>Universidade Federal de Santa Maria</i>	9
	<i>Universidade Federal do Paraná</i>	10
1998	<i>Universidade Federal do Paraná</i>	20
	<i>Universidade Federal de Pelotas</i>	20
	<i>Universidade de Passo Fundo</i>	15
	<i>Universidade do Contestado</i>	10
2000	<i>Universidade Federal de Santa Maria</i>	19
	<i>Universidade de Caxias do Sul</i>	20
2008	<i>Universidade Comunitária da Região de Chapecó</i>	16
<b>Total</b>		<b>220</b>

Consolidated as an excellence program, PEN has invested in the training of Masters and PhDs as part of a strategy for training leaders, to encourage critical reflection on the problems of society and of the profession. Today, added to agreements and partnerships with other educational and health institutions, this effort places the scientific and technological production of this Program in full harmony with the globalized world. It also incorporates the principles of usefulness of the results of the studies and research developed, both for academic communities at the national and international level, and for society in general, due to their adherence to local, national and global problems.

In this sense, the Program has stood out for its teaching-service articulation and health promotion, with training of human resources to work in various social spheres, both nationally and internationally. PEN graduates develop projects in partnership with different non-governmental and governmental social institutions (Municipal Health Secretariat of Florianópolis, State Health Secretariat, Ministry of Health, Ministry of Education, Ministry of Science and Technology). It also privileges articulation actions

with organizational, scientific and knowledge dissemination entities, especially through consultancy and representation with scientific and professional entities.

## **Economic impact**

The Economic impact is understood from the improvement of indicators related to the activities developed by the programs in relation to the production, distribution and consumption of goods and services and by trained human resources. From this perspective, the economic impact is evaluated based on three indicators: those associated with the products/processes arising from the work developed by professors and students; those related to the improvement of the income and working conditions of the programs' graduates; and those that demonstrate the self-sufficiency ability of the graduate programs. The first indicator includes "the development and registration of products/processes that generate improvements in the work environment; in the living conditions of the region's population; economic and financial gains for the organization; incorporation of research results in professional practice environments with definition of the innovative aspects and their cost-benefit ratio; proof of the efficiency of new forms of care based on research results that demonstrate advances in different areas of Nursing knowledge; development and validation of new ways of diagnosing and intervening in Nursing problems in order to allow greater efficiency in decision-making and, consequently, to obtain better health results"<sup>2:14</sup>.

It is to be noted that this indicator comprises a range of aspects that are strongly found in the performance of teachers and students in their respective groups or teaching, research, technology and performance laboratories with society, whose impacts have not been duly registered and analyzed under the direct or indirect economic aspects. Insertion and intervention in the environment and in the health care practice from the perspective of organizational management, formal education and permanent education, studies with analysis and proposals for solutions to problems, contributing with new knowledge and better care practices, among others, will surely result in economic gains.

The Nursing work is recognized as highly resolute in population health care and is characterized as the largest workforce in the SUS in terms of number of workers. In addition, the accelerated scientific and technological advances and different levels of performance and training of Nursing professionals have been demanding partnerships between the academia/universities and health care institutions, with mutual interests marking a new era in the relationships between the different segments of society.

The second indicator considers the training and labor incorporation of human resources trained in the graduate programs. In this indicator, an increase in the number of graduates in decision-making positions is expected, with their incorporation in work environments corresponding to their area of interest, and a consequent increase in their income. Furthermore, the approval for holding public positions and the changes implemented by these graduates in the health services are relevant points to establish the economic impact produced by the programs<sup>2</sup>.

To illustrate this indicator, data on the mean income reported by the graduates of the Program's Master's and PhD courses are presented in Table 3.

**Table 3** – Mean income of graduates from Master's and PhD courses.  
PEN/UFSC, Florianópolis, SC, Brazil, 2021.

Income range	Master's degree		PhD	
	N	%	N	%
Up to 3 MWs* (Up to 3,474.00)	20	15.04	4	5.13
From 3 to 5 MWs* (From 3,475.00 to 5,790.00)	36	27.07	13	16.67
From 5 to 10 MWs* (From 5,791.00 to 11,580.00)	60	45.11	39	50
From 10 to 20 MWs* (From 11,581.00 to 23,160.00)	12	9.02	19	24.36
No income	5	3.76	3	3.85
<b>Total</b>	<b>133</b>		<b>78</b>	

\*MWs=Minimum Wages: R\$ 1,045.00 in 2020.

The indicator of improvement in the income and working conditions of the program's graduates evidenced a higher proportion of Master's in the salary ranges from 5 to 10 minimum wages and of PhDs in the range from 10 to 20 minimum wages. This result makes it possible to infer that there is an increase in income from completion of the PhD Course.

Indications of economic self-sufficiency produced by the graduate programs, such as the ability to raise funds at the local, regional, national and international levels, especially when such funding involves the participation of students and graduates, or even when they are directly responsible for funding acquisition, is the third indicator of economic impact indicated by the Nursing Area – CAPES<sup>2</sup>.

In PEN/UFSC, of the total number of respondents (n=350), 72(20,57%) graduates indicated receiving funding for a research or innovation project (as coordinators, collaborators or proponents) or participating in a funded project in the last 5 years. Likewise, the researchers-professors have been intensifying the acquisition of financial resources in their research laboratories with projects funded with the participation of students and graduates in multicentric projects and interprofessional, national and international partnerships. Such actions constitute learning about project management in the training of researchers, as well as they produce more qualified knowledge by relying on the most advanced instruments and resources.

According to consolidated data, in the 2013-2016 Quadrennial Evaluation Form – CAPES, PEN presented a proportion of the Permanent Faculty (PF) with important fundraising for research studies: 12 (50.4%) had a CNPq research grant, and 11 (46.2%) had a Research Productivity Grant (in the following modalities: 2 at level 1A; 2 at level 1B; 1 at level 1C; 5 at level 2; 1 at level 1D and 1 (4.2%) Technological Development and Innovative Extension Scholarship - DT2. Therefore, in that quadrennium, 50.4% of the professors had national qualification and competitiveness. There was also important fundraising from international agencies, with evolution over the four-year period: 2013 (4PF), 2014 (4PF), 2015 (7PF), 2016 (7PF), in addition to assistance in national agencies. During the four-year period, the PEN professors showed high fundraising capacity (96.8% of the PF), which evidenced very good performance (80% or more), according to the Area's criterion.

## DISCUSSION

The process of training highly qualified human resources in the Health area through Master's and PhD courses aims at training strategic cadres of professionals who are able and capable of producing knowledge and of proposing and conducting policies and actions in the Health area. Its purpose is to provide professionals aware of new knowledge and capable of following up on innovation processes, in order to develop projects that will solve problems observed in their performance area. In addition to staying alert on the changes that occur in specific professional areas, PPGs are committed to helping professionals qualify as researchers, whose necessary skills complement each other, while at the same time are distinguished from one another. The challenge is to train professionals who have critical and self-critical ability, an ethical posture, commitment and social responsibility, and who contribute to strengthening the field of disciplinary knowledge<sup>8-11</sup>.

Following and monitoring the process of PhD education in Nursing has therefore been a topic on the agenda in the entire world<sup>4,11-12</sup>. Increasingly complex and systematic assessment systems play a fundamental role in reorienting the training processes, and new indicators are needed to address this complexity, such as those herein discussed. For this reason, the assessment of the impacts – technological, political, social and economic – of graduate studies in Nursing is undoubtedly a challenge to be faced, given the difficulties identifying quantitative and qualitative evidence that allows such verification. This is not a simple task and requires the scientific Nursing community to address the issue.

When we discuss the technological impacts, we need to acknowledge that the incorporation of new processes and/or products in the field of Nursing constitutes an indicator that is difficult to ascertain, since multiple factors contribute to this. However, the innovation in the application of the knowledge produced could have been evidenced if, during the existence of this Program (and of the set of Brazilian programs), indicators and a registration system had been created for this purpose. Even because, in the academic programs' scope, this was not an explicit intention.

In this sense, in this study, it was not possible to explore in depth the indicator of development and registration of products/processes that generated improvements in the work environment. However, it is important to emphasize that one of the main objectives of graduate education in Nursing is to train nurses to produce and synthesize reliable and applicable research evidence in meeting the patients' needs, seeking innovations and adaptations according to the complexity of the social, cultural, economic and health systems.

This situation is corroborated by studies that pointed out to reduced development of products that allow for the registration of patents, given the intellectual production, by graduates from the graduate programs in Nursing, showing a gap between scientific production and technological production. According to the authors, Brazil and Brazilian Nursing do not have technical-scientific conditions that favor the development of technologies, an area still with ample possibility of evolution<sup>9,13</sup>.

This impact begins to have relevance more recently in the context of Brazilian science, when this issue comes to the fore through the National Policy on Science, Technology and Innovation in Health (*Política Nacional de Ciência, Tecnologia e Inovação em Saúde*, PNCTIS) (2004), followed by various instruments and policies that contributed to the strengthening of Science, Technology and Innovation in Health (*Ciência, Tecnologia e Inovação em Saúde*, CT&I/S), which are configured as strong allies for fostering innovation in the Health area<sup>14</sup>.

In the field of training the qualified human resources, this movement stimulated the creation of the first Professional PhD courses in Nursing in Brazil, whose purpose is the development of products and processes. This initiative tends to reinforce, as well as to give greater visibility to the potential of nurses in the development of products and processes for health care, as has been observed

internationally<sup>15</sup>. Even so, this task is not restricted to professional Master's and PhD courses, and PEN/UFSC, an academic program, has been contributing in recent years to the production of technologies in Health and Nursing. Since 2014, there have been thirteen registrations (or requests) of patents, mainly aimed at the assistance field.

The nurses' potential for innovation became even more evident with the COVID-19 pandemic, which generated unprecedented clinical and managerial demands for the health services, especially in intensive care settings. A study conducted with nurses working in the care of patients with COVID-19 identified the development of innovations aimed at improving the Personal Protective Equipment (PPE), providing guidelines to the patients and support to the families, as well as improving communication among the health team members. This reinforces that nurses are in a unique position to generate innovative solutions to meet patient care needs in adverse situations that require rapid changes<sup>16</sup>.

If the technological advances in Nursing are emerging, policies are still needed to increase them, as well as a greater approach to the theme in undergraduate and graduate education. In the health services, the production of technologies and innovations in Nursing is growing; however, they are not always registered and patented. It is also important to carry out research studies investigating the effects of incorporating technologies in the professional practice<sup>17</sup>.

In the case of PEN/UFSC, one of the aspects that has favored the development of technological innovations is the investment of *Universidade Federal de Santa Catarina* in defining legislation and research, development and innovation programs. In addition to that, the researchers have the support of a Secretariat for Innovation to provide guidelines and support in the registration of patents, computer programs, industrial designs, brands and cultivars.

Like the economic impact, the political impact lacks greater visibility. The global recognition of academic nurses for the quality of their PhD training in Nursing and the continuous assessment of the quality of the existing programs are imperious for the advancement of the profession, for the promotion of good Nursing practices, for the increase of associative leaderships and institutional management positions in the health system and academic training, and for the formulation and implementation of public policies and generation of processes and products<sup>1,4,9,11,18-20</sup>. By directing towards solidarity strategies, a study carried out with Master's degree graduates from Angola and Mozambique, showed that they began to hold high positions such as managers, directors and State secretaries, in addition to working as managers in health and teaching programs. They pointed out the "academic-professional training", "personal growth" and "expansion of the network of relationships" attributes as of with high impact<sup>21</sup>.

Therefore, in addition to the academic activity of graduates from a graduate program, the understanding that the role of a PhD in Nursing involves developing scientific and technological research to solve critical problems that affect Nursing and Health practices is consolidated, contributing social and economic benefits in a short period of time. In addition, the role of a PhD within health care institutions in Brazil is a challenge since, in order to consider the political impact, it is necessary to know what such action actually consists of<sup>9</sup>. Are these PhD nurses acting as implementers and promoters of policies included in the elaboration and discussion of the health policies? Even though we are aware that a significant number of graduates have potential political insertion in the different health and education contexts, this is one of the aspects that needs to be better highlighted in the process of evaluating graduates.

Despite recognizing the scientificity of Nursing knowledge at the academic and political-economic-social level, we are aware of how much the commodification of health influences the nurses' professional values, not as enhancers of a transformation, but as resulting values and reproducers of the very changes resulting from this commodification. In its turn, this prevailing logic makes working

conditions precarious, minimizes investments and changes the perspective on training, paradoxically, imposing redoubled challenges for the nurses' political involvement<sup>22-23</sup>.

From the perspective of contemporary science, it is necessary to strengthen the assumption that the researcher's training is political, which requires attitude, responsible involvement, leadership to solve problems and decision-making, often to contradict common sense<sup>24</sup>. And the constitution of political subjects corresponds to two of the four pillars of training: knowing how to live together and knowing how to be<sup>23</sup>. Thus, it is not enough only to do research and be inserted in the social context of health, but also to get involved with the professional class and defend ideas in a critical-reflective posture. It is necessary to strengthen the citizenship frameworks, the critical posture, and defense of quality research in line with the social needs, in order to, then, expand health care with freedom and class autonomy<sup>24-25</sup>.

In this aspect, increasingly, it demands considering that the professional entities are configured as spaces to gather workers, which can favor critical-reflective training and the understanding of the political, social and professional context in which they are inserted. Participation in these institutions stimulates discussions about the profession and the feeling of belonging to the group, enhancing actions aimed at the collective. Thus, it is assumed that participation in collective organizations enables engagement and political action<sup>22-23</sup>. In addition, the configuration of the United Nations' 17 Sustainable Development Goals, which seek to promote a safe, healthy and equitable world by 2030, through citizenship and professional leadership, also raises political postures in Nursing<sup>26</sup>.

One aspect that, pertinently, needs to be problematized regarding the issue of insertion and political impact, is precisely the *a priori* assumption that a professional graduate program is aimed at service, while an academic graduate program is aimed at teaching and research, as recommended by the legislation and by the most common discourses on the topic. However, from the perspective of training and scientific production, the academic and professional modalities seek to preserve purposes such as strengthening the health policies, improving the quality of the services, disseminating knowledge, management development, technology management, formulation and implementation of policies and consolidation of the University as a reference in the social context. Thus, we understand the need to discuss the following: Why in the political dimension of strengthening the health system is this topic mentioned in a generic way in the academic PPG? After all, what is academic research in the field of Health based on if not on problems and issues arising from the services? In addition to that, it is not new that many research studies carried out in universities are funded by companies that are looking for a solution for a product or service, or even a new technology, which reflects another form of approach<sup>27</sup>.

In this sense, we corroborate the understanding that the professional PhD prepares nurses in the practice to improve the results of the care provided to the patients and translate/apply the best evidence in their work environment. In its turn, the academic PhD prepares people to conduct research studies and test interventions aimed at the advancement of the Nursing science. Both modalities are essential to assemble a Nursing workforce capable of dealing with the growing and complex demands of the health system<sup>28</sup>. Furthermore, there is an assumption that translating research into practice is less difficult than generating new knowledge through scientific research;<sup>29</sup> both modalities are difficult and complement each other, and they can enhance the practice of the profession, as well as its social visibility and responsibility functions<sup>28</sup>.

As complex as the political impact, the social impacts produced by *stricto sensu* programs are varied and take place over a long-term horizon, whose evidence is often difficult to identify. They are also loaded with subjectivity, especially when it comes to training in the Health field. Despite such difficulties, there is consensus that knowing the impact of graduates on society allows identifying

which actions can contribute to the development of more effective professional training processes in the construction of a fairer and more sustainable society.

Most graduates of the program under study report having evolved and attribute such positive result to the course. They highlight a decrease in the number of occupations at lower hierarchical levels and an increase in holding Board and coordination positions in the institutions where they work, considering that they have obtained this career evolution after completing their graduate studies. This rise in position certainly exerts an impact on the income dimension. Most of the graduates report having perceived positive results in this dimension, although the indicators are herein influenced by other factors related to the development of skills throughout their career, the concrete conditions of the labor market and the category's valuation policies<sup>30</sup>.

The results regarding the professional performance of PEN graduates are close to those found in other studies<sup>31</sup>, indicating that the teaching activity in higher education institutions is still the main activity of graduates from Brazilian graduate courses. However, the data from this research indicate greater insertion of these professionals in other public and private institutions, in addition to the HEIs. Such data can also indicate possible training demands, considering the new places of professional insertion for the graduates.

The courage to dare, innovate and seek creative strategies in the training of nurses/researchers, based on teaching work with an interprofessional, interdisciplinary and cooperative view, with different actors, institutions and national and international developments has, in some way, contributed to this change in the scenario.

The experience with expanded courses is an example of this boldness by PEN/UFSC. Over these years, the Program has stood out in this type of policy in the Nursing area in the country, as it has been systematically offering classes in this modality (expanded, initially and inter-institutional/ CAPES) to different recipients in different Brazilian regions, as well as for Latin America.

Thus, PEN has contributed to an important policy to strengthen Nursing. The offer of MINTER/ DINTER classes in Nursing takes place in regions, in Brazil or abroad, far from the teaching and research centers, relying on the solidarity of consolidated programs, contributing to the qualification of human resources for teaching and/or research, strengthening of research groups, and fostering cooperation between teaching and research institutions. This initiative allows the formation of a critical mass for the creation of graduate programs, at the Master's and PhD levels in these places, contributing to overcoming the regional inequalities that have already been strongly identified and pointed out by the Coordination of the Nursing Area - CAPES<sup>2</sup>.

Within the scope of PEN/UFSC, this cooperation policy, over a long period of time, gave its faculty security regarding its development, as well as confidence and recognition in the quality of the product, whether in terms of the qualification of Master's and PhDs, or in terms of results in the scientific and technological development of Nursing and its repercussions for the entire field of Health. In their turn, the countless activities developed by the PEN graduates, added to the activities by students and teachers, allow asserting that the program's performance has produced social impacts on society, both locally as well as nationally and internationally.

Undoubtedly, measuring the social impact of the training of researchers in Nursing and its product - research studies - is a major challenge. The social usefulness of science is a discussion object in the different knowledge areas. Talking about social impact presupposes long-term results, which involve programs and public policies to intervene in some way in the social sectors, appropriating the contents of the research studies. There are conjectures in this sense; however, precise methods of how this impact can be measured have not yet been established<sup>32</sup>.

As for the economic impacts, the first indicator related to products/processes arising from studies carried out by professors and students is in line with the dimension related to the technological impacts. The emphasis given by CAPES to this indicator points to the importance of developing new studies that can scale the contributions of the research results in the professional practice environments, proving the efficiency of new care modalities in Health and Nursing.

Graduate studies enable nurses to leverage their research experience and practical knowledge to transform health policies and practices, especially when assuming leadership positions in the health services and systems<sup>33</sup>. However, in a context increasingly influenced by the dominance of material technologies and market values, it is difficult to measure the contribution and economic usefulness of Nursing care in the context of work in health. Otherwise, as Nursing products have social good characteristics, “open” technological production is increasingly seen, that is, offering free access and use by the Nursing professionals and health services.

Income, of course, is a substantial professional achievement marker. However, it is important to point out that it is not the only aspect to be considered when analyzing the success and insertion in the labor market of higher education graduates. A North American study conducted with 92,113 undergraduate and graduate students from 155 art schools or colleges, for example, evidenced that intrinsic satisfaction is the main component of general job satisfaction. A sense of self-worth, personal achievement and social contribution were shown to be more relevant to the participants, when compared to financial success<sup>12</sup>.

As for the self-sufficiency ability of the graduate programs, despite the efforts by professors and graduates in raising financial resources (with a significant increase in recent years), it is necessary to register the crisis in funding research, graduate studies and public universities in Brazil in the last five years. Since 2015, due to economic and political crises, there has been a reduction in funding opportunities by public research supporting agencies<sup>34</sup>. In this sense, it is worth asking: What weight can an indicator that considers the fund raising ability of a PPG have, since it is highly sensitive to changes in the political scenario of public support for science and technology?

In addition to that, Nursing has certain difficulty attracting private investments due to the nature of its work and its object – Nursing care. Unlike other health sectors, considered as strategic areas to foster innovation, bridging the gap between biotechnological research and production, such as clinical research that generates health products (medications, drugs and other inputs)<sup>14</sup>, Nursing care has the meaning of promoting life, the vital potential, the well-being of human beings in their individuality, complexity and integrality. It involves an interpersonal meeting with a therapeutic objective of comfort and healing, when possible, and also preparation for death, when inevitable. However, it is important to consider that the construction of a scientific discipline, as well as the organization of a profession, does not take place in a neutral scenario, without a dispute for power and economic and political interests. In today’s society, structured under the standards of capitalism, organized for competition and the market, it is closer to the interests of the medication and hospital equipment production industries, and to the standards of positive science, than to care practices that are aligned with the ideals of equality, social justice, well-being and happiness<sup>30</sup>.

## FINAL CONSIDERATIONS

The study aimed at discussing the different impacts - technological, political, social and economic - of graduate Nursing studies, discussing its indicators and their adequacy, including adjacent or complementary aspects, such as the impact on the advancement of science, education, culture and organizational management, among others.

From the analysis of the contributions of an Academic Graduate Program in Nursing, the expected impacts and their indicators, and respective criteria indicated by CAPES, were problematized regarding the best adequacy and completeness to the field of Nursing and Health, according to the genesis and nature of care, the Nursing science and the interfaces with other fields of knowledge.

Strategies for monitoring graduates of Graduate Programs in Nursing can provide subsidies for the improvement of training processes and assist in the restructuring of these processes, in order to produce changes in the professional world and to strengthen disciplinary knowledge. Therefore, monitoring the graduates is also an important tool for defining improvements in the management process of a Graduate Program.

The graduate programs in Nursing increasingly need to articulate the theoretical and philosophical constructions of disciplinary knowledge with proposals of policies, systems, models, processes, techniques, instruments, care assessments and/or intervention practices, among others, accounting for the need to promote changes or transformations in health, honoring the commitment to adhere to the contexts where they take place. In addition, in order to propitiate recognition and visibility to this articulation process, it is imperative to invest in studies and in the proposal of indicators and impact criteria that may overcome the limitations pointed out and consider the specificities therein involved, in order to highlight the real impact of the *stricto sensu* graduate programs in Nursing in society.

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## NOTES

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### CONTRIBUTION OF AUTHORITY

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