Graduate Studies Stricto Sensu and the Use of Digital Technologies: A Literally Restricted Field?

Sayonara Ribeiro Marcelino Cruz[1] https://orcid.org/0000-0002-3176-1270
Eucidio Pimenta Arruda[2] https://orcid.org/0000-0002-9201-6530
[12] Universidade Federal de Minas Gerais

ABSTRACT

This study intends to identify literature related to the following theme: "Staff training in the use of digital technologies in post graduate education", to better understand how the relation between learning and technology has been dealt with in higher educação, specifically in Post-Graduation. A bibliographical revision was made using the data basis from the Periodic Portal for National Coordination of Staf if improvement in Higher Education from 2015 to 2018. Forty two studies were found that dealt specifically with discussions on TDIC in masters and doctors' degrees in the area of Education, indicating the early stage of research on this specific theme. A deep analysis of 10 studies was made, which dealt directly with our objectives, confirming a great quantitative and qualitative leap in regards not only to the increasing number of studies but also of thematic possibilities that involve rethinking the relationship between technology and education. Discussions indicate a clear (and necessary) focus on the technical dimension (methods, techniques, strategies, skills and capabilities), however, there is little evidence that much articulation was made on the conceptual and pedagogical dimensions, without which there can be no advancements on the usage and spread of the the possibilities in the TDIC and their repercussions in learning.

KEYWORDS

Teacher training. Digital technologies in education. Postgraduate studies. CAPES.

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Corresponding to Authors

[1]Sayonara Ribeiro Marcelino Cruz
E-mail: sayormcruz@gmail.com
Universidade Federal de Minas Gerais
Belo Horizonte, MG, Brasil
CV Lattes
http://lattes.cnpq.br/0430290686537458

[2]Eucidio Pimenta Arruda
E-mail: eucido@gmail.com
Universidade Federal de Minas Gerais
Belo Horizonte, MG, Brasil
CV Lattes
http://lattes.cnpq.br/9029995370012419

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Formação na Pós-Graduação Stricto Sensu e o Uso de Tecnologias Digitais: um Campo Literalmente Restrito?

RESUMO

Este trabalho tem como objetivo identificar as produções relacionadas a temática: “formação docente para o uso de tecnologias digitais na pós-graduação”, com vistas a compreender de que forma a relação aprendizagem e tecnologias tem sido tratada no ensino superior, especificamente na Pós-Graduação. Foi feita uma revisão bibliográfica na base de dados do Portal de Periódicos da Coordenação Nacional de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) no período de 2015 a 2018. Confirmam um grande salto quantitativo e qualitativo a considerar o aumento crescente não só do número de trabalhos, mas de possibilidades temáticas que envolvem pensar as relações entre tecnologia e educação. Foram encontrados 42 trabalhos que tratam especificamente da discussão sobre TDIC nos cursos de mestrado e doutorado na área da Educação, apontando uma a incipiência de estudos com essa temática específica. Aprofundamos na análise de 10 trabalhos com aproximação direta com os nossos objetivos que confirmam a preponderante (e necessária) preocupação com a dimensão técnica (métodos, técnicas, estratégias, habilidades e competências), porém com poucas evidências de articulação com a dimensão conceitual e pedagógica, sem a qual torna-se impossível avançar na apropriação e difusão das potencialidades das TDIC e suas repercussões na aprendizagem.

PALAVRAS - CHAVE

Formação docente. Tecnologias digitais na educação. Pós-graduação. CAPES.

Estudios de posgrado Stricto Sensu y el uso de tecnologías digitales: ¿un campo literalmente restringido?

RESUMEN

Este trabajo tiene como objetivo identificar las producciones relacionadas con la temática: "La formación docente para el uso de tecnologías digitales en estudios de posgrado", con miras a comprender cómo se ha tratado la relación entre aprendizaje y tecnologías en la educación superior, específicamente en Posgrado. Se realizó una revisión bibliográfica en la base de datos del Portal de Revistas de la Coordinación Nacional de Perfeccionamiento del Personal de Educación Superior (CAPES) de 2015 a 2018. Confirman un gran salto cuantitativo y cualitativo considerando el incremento creciente no solo en el número de trabajos, pero con posibilidades temáticas que implican pensar en la relación entre tecnología y educación. Se encontraron 42 trabajos que tratan específicamente de la discusión del TDIC en los cursos de maestría y doctorado en el campo de la Educación, apuntando a la incipiencia de estudios con esta temática específica. Profundizamos el análisis de 10 trabajos con un acercamiento directo a nuestros objetivos que confirman la preocupación predominante (y necesaria) por la dimensión técnica (métodos, técnicas, estrategias, habilidades y competencias), pero con poca evidencia de articulación con lo conceptual y pedagógico. dimensión, sin la cual se hace imposible avanzar en la apropiación y difusión de las potencialidades del TDIC y sus repercusiones en el aprendizaje.

PALABRAS CLAVES

Formación de profesores. Tecnologías digitales en la educación. Posgraduación. CAPES.

1 Introduction

This work aims to identify the productions related to the theme: "teacher training for the use of digital technologies in graduate studies", in order to understand how the relationship between learning and technologies has been treated in higher education, specifically in graduate studies. We are interested in problematizing how the discussions about technologies have impacted the development of digital competencies needed to train teachers and researchers at the graduate level.

In our studies and research, we have defended that the incipiency of conceptual and practical discussions in graduate education reverberate in the initial training and in basic education, feeding a gaping cycle of training for the development of digital competencies. This makes us far from providing educational processes that meet the needs of today's society, as pointed out by Arruda and Mill (2021).

The methodology used was based on a literature review in the Periodical Portal database of the National Coordination for the Improvement of Higher Education Personnel (CAPES) in the period from 2015 to 2018, which will be better described in the second of the four sections in which the organization of this study is structured.

In the first section, we characterize post-graduate education in Brazil, contextualizing its trajectory from the National Post-Graduation Evaluation Plans (PNPG), highlighting the ambiguities and the need for articulation with initial training and basic education.

In the second section we describe the search and selection process of the papers, which is important to show that when we explore the implications of the discussions about technologies in the training offered in PG we enter a complex, diverse and lacunar field.

In the third section we present the analysis of the selected papers, allowing an understanding of the stage of studies on technologies and education. This analysis is important to understand the complex relationship that is built between the gaps in technological training presented to students in basic education, the dimensions of teacher training, in undergraduate courses, as well as those who will possibly become teachers in undergraduate courses.

1.1 From teacher training to researcher training: on the trajectory

We resorted to article 44 of the Law of Directives and Bases of National Education, Law number 9.394, enacted on December 20, 1996, to start our reflections (BRASIL, 1996).

As explained in the name itself, graduate courses are those which are offered literally after graduation.

> Higher education shall encompass the following courses and programs: I - sequential courses...; II - undergraduate courses... III - post-graduate courses, including master's and doctoral programs, specialization courses, improvement courses and others, open to candidates who have graduated from undergraduate programs and who meet the requirements of the educational institutions (BRASIL, 1996).

Historically, while the specialization courses seek to deepen in a particular field that has a direct or closer relationship with the field of work, the master's and Doctoral courses aim to train individuals who produce science, scientific knowledge, who develop teaching, research, and extension from the innovative production of scientific knowledge. However, despite involving teaching and research in an integrated way, studies have shown that these courses fail in the teaching dimension (Almeida 2011, 2012), Torres (2014), Almeida and Pimenta (2009), which directly implies in the training of basic education teachers. This fact led us to investigate the training offered in the PPGE for the development of digital competencies.

The trajectory of higher education in Brazil is very recent, coming from professionalizing models that carry distortions and asymmetries, object of questionings and discussions under different theoretical lenses. When entering the post-graduation field, we have an even more recent trajectory, marked by contradictions and complexities in its identity and curricular constitution.

The original context of the graduate studies can be read in two different ways, without depreciating one of them. The first graduate program in Education in Brazil was the one at the Pontifical Catholic University of Rio de Janeiro, at the master's level, in 1965, the same year in which the Graduate Studies Program in Educational Psychology of the Pontifical Catholic University of São Paulo was also established. In that same year, the Federal Education Council's opinion 977/65, authored by Newton Sucupira, dealt with the conceptualization of graduate studies and the opinion 77/69, approved on February 11, 1969, regulated the implementation of graduate studies in Brazil (SAVIANI, 2000).

Between 1971 and 1972 ten courses were created and in 1975 there were already 16 (ANDRÉ, 2007). For Saviani (2000), who considers this implementation period as one of the richest and most consistent post-graduation experiences, this was a scenario marked by a bold courage and persistence of its precursors, who circumvented a multitude of obstacles such as, for example, the absence of structural conditions, the small number of teachers with compatible training, to emphasize the efforts undertaken in this period, resulting in the expansion of academic horizons and advances in scientific and technological areas of the country. According to the mentioned author, this wealth was the result of the fusion between a very

articulated organizational structure, derived from the American influence, and the effort to guarantee a satisfactory degree of theoretical density, derived from the European influence.

Contrary to this optimistic view, Gatti (2001) describes this historical process as the result of a deliberate policy of state agencies, aimed at serving the interests of a small elitist group. The universities were born in a context of improvisation and aggregation of courses, very few had research as an integral part of their teachers' work, bringing to higher education the idea that is still perpetuated, that classrooms and teachers with some bachelor's degree are enough for this teaching. According to Cury (1991), the post-graduation was not constituted from

> a defined, formalized and organically expressed policy, either by the State or by the university", until the University Reform movement of 1968, when it was born with the role of displaying "the most modern" (CURY, 1991 apud Morosin, 2006, p.264).

In 1976, the Coordination for the Improvement of Higher Education Personnel (CAPES), a foundation of the Ministry of Education (MEC), which played a fundamental role in the expansion and consolidation of stricto sensu graduate studies (master's and doctoral degrees), acted in the induction, evaluation, financing, and dissemination of scientific production. In 2007, it also started to act in the training of basic education teachers, expanding the reach of its actions in the training of qualified personnel in Brazil and abroad.

One of the strategies employed by CAPES, in view of this objective of consolidating Postgraduation in the country, was to create an evaluation system encompassing two processes: the Evaluation of New Course Proposals and the Evaluation of Postgraduation Programs. As a result of this policy, an evaluation program was implemented at a national level in all Postgraduation courses in the country, currently conducted every four years, resulting in the Postgraduation National Plans - PNPG.

Therefore, it is through this evaluation process conducted by CAPES that the accreditation, the non-accreditation and the classification of master's and doctorate programs takes place, according to pre-established criteria, in addition to providing subsidies for the decisions of governmental bodies regarding investments in research.

The analysis of the CAPES evaluation reports proves that, in spite of such a short period of time of existence, the Brazilian post-graduation has advanced in the last years at a very intense pace. Despite the many criticisms raised in the literature of the area, which have also contributed to the improvement of the processes, it is possible to see a conductive line and the dynamics that permeate this trajectory, as summarized below:

The 1st Plan (1975-1979) had as its main mission the principle of state planning of postgraduate activities, integrating them into graduation and fostering research, with the aim of training specialists - teachers, researchers, and technical staff - for higher education, the public sector, and the industrial sector. The 2nd Plan (1982-1985), on the other hand, maintains the emphases of the previous plan, and adds the evaluation instrument. The 3rd Plan (1986-1989) subordinates post-graduation activities to the economic development of the country, through the integration of post-graduation courses into the national science and technology system.

The 4th Plan, on the other hand, the one that was not enacted, but whose guidelines were adopted by CAPES, was characterized by the emphasis on the system expansion, on the diversification of the post-graduation model, on the introduction of changes in the evaluation process and on the international insertion of the SNPG. The 5th Plan, the PNPG 2005-2010, is characterized by the introduction of the principle of strategic induction in post-graduation activities, the concern with solidarity among courses and their social impact, the expansion of international cooperation, the fight against asymmetries, the training of human resources for technological innovation and the emphasis on the training of teachers for all in the globalized and competitive world, as well as of technical staff via professional master's degree for the teaching sectors, public and private, and public and private services (BRASIL, 2010, p.16-17).

In the PNPG 2005-2010, according to Morosin (2006) the system expansion should have four strands: the training of teaching staff for Higher Education institutions, the qualification of basic education teachers, the specialization of professionals for the public and private labor market and the training of technicians and researchers for public and private companies. It is explicit the proposal to make the post-graduation model more flexible, aiming at the growth of the system, the formation of professionals with different profiles to meet the dynamics of the academic and non-academic sectors.

Currently the post-graduation policy is a clear reflection of these systematization and improvement processes, coordinated by CAPES. This contextualization exercise helped us understand the potentialities and weaknesses of the scenario that is unfolding, especially in relation to the area of Education.

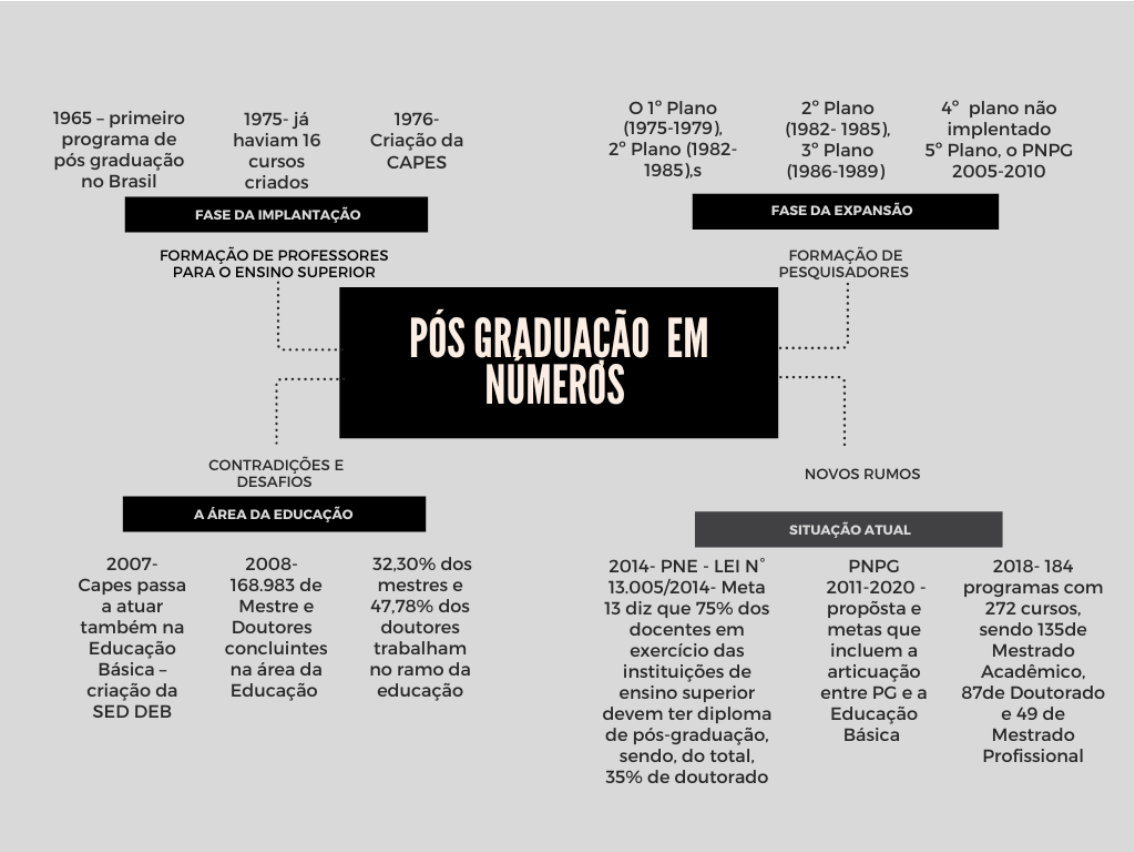
It can be noticed that the initial characterization focused on professional education was giving way to the academic-scientific deepening, aiming at the formation of high-level researchers, under the perspective of human capital, in response to the developmentalist policy, mainly of the military governments (GATTI, 2001).

The positive results in the advancement of institutions and technological areas in the country cannot be disregarded. There was a large increase in the number of masters and doctors, but the concern with the quality and the real purposes of this training will only become evident

in the IV PNPG, which, due to various and adverse circumstances, ended up not being implemented.

It is in the last PNPG 2011-2020, that a concern with the quality of teacher education and the integration between graduation and post-graduation is resumed, signaling new paths and different possibilities to meet the priorities. This plan also makes explicit the need for the articulation of graduate programs with basic education. Figure 1 summarizes the advances and the main challenges listed.

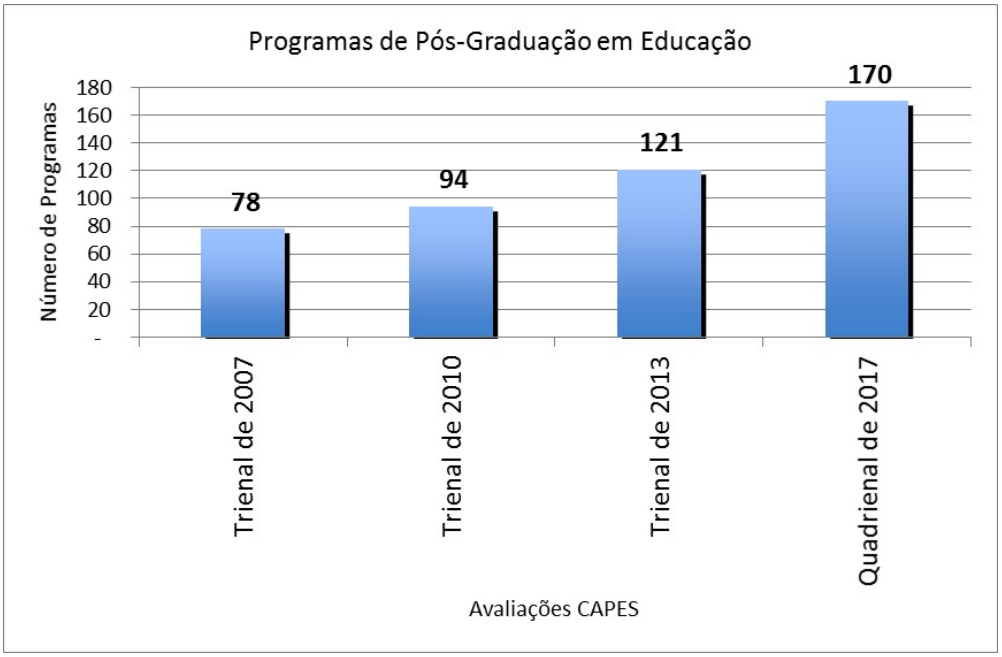
Figure 1: Infographic: Post-graduation in numbers



Source: Prepared by the authors. Image changed

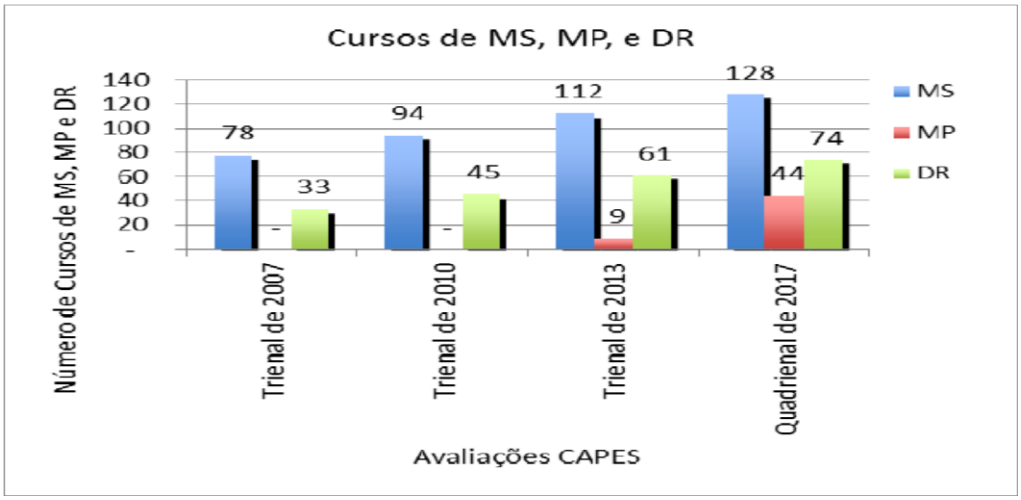
The 2017 quadrennial evaluation confirms the expansion of the offer, through the 40% expansion from the triennial of 2013 to 2017, led by public institutions. The insertion of professional master's degrees and an effort to reduce regional disparities stand out, as can be seen in Charts 1 and 2.

Graph 1. Evolution in the number of graduate programs in Education



Source: Brazil (2017, p. 59).

Graph 2. Evolution in the number of Master's (MS), Professional Master's (PM) and PhD (DR) courses image changed



Source: Capes Brazil Evaluation (2017, p. 61).

It has been sought to consolidate and expand the quality of production of the programs, improving postgraduate training. Special emphasis has been given to doctoral courses, to the extent that the training of doctors is a basic condition for the expansion of the graduate system as a whole (BRASIL, 2017, p. 3). But the increase in the number of students and doctors, accompanied by an evident growth in scientific production, was not duly accompanied by the expansion of financial, material, and human resources. Many researchers have denounced the quality of research and the precarious working conditions, such as Isaia (2001,2007), Cunha

(2018), which has fueled the discussion about the urgent need to rethink the social function of the post-graduation.

The implementation and expansion of master's and doctoral programs, shows us that despite having this turned to supply the demand for teachers for higher education, its vocation for training researchers has reaffirmed itself as the specificity and the main character of the training proposal in stricto sensu level in Brazil.

A study coordinated by Velloso (2004) mapped the destiny of the masters and doctors graduated in nine areas of knowledge, finding that of the 3,598 graduates surveyed 2,161 are working in graduate programs, that is, approximately 60% of the investigated graduates are already working professionally in Higher Education institutions.

The research of Fávaro et al. (2016) investigated the trajectories and institutional destinations of graduates of doctoral courses in Education at Brazilian public universities in the last twelve years (2000-2012), finding a clear predominance of professional performance in academia, especially in university teaching. Studies such as these point to the need to review the models of post-graduate education in Brazil. If on the one hand it is necessary to broaden the range of training, aiming at the diversity of professional insertion that characterizes our current society, on the other hand it is necessary to assume the vocation for university teaching.

For a long time, institutions have been free of the obligation to contribute to this training, considering the teaching knowledge derived from practice as sufficient for the exercise of the function. Cunha (2006) points out that naturalizing the exercise of teaching, based on student experiences, is responsible for perpetuating the processes of cultural reproduction and devaluation of teaching professionalism. A conception that restricts access and hinders the expansion of programs has persisted in the discourses and can be seen in funding policies and in the documents that regulate and evaluate master's and doctoral degrees, minimizing other important functions, such as training teachers for higher education teaching or training specialized professionals capable of bringing and producing theoretical knowledge and employing them in solving problems in their respective environments of professional performance: university teaching.

Almeida (2011, 2012), Torres (2014), Almeida and Pimenta (2009) have pointed out, within the conceptual field of University Pedagogy, ways to face the challenges and changes of higher education in the current context, based on the training of teachers allied to their professional development. Torres (2014) points out in his studies on continuing education for the exercise of teaching in higher education the presence of discussion on the pedagogical use of technologies.

Researchers such as Mishra and Koeller (2006), Koehler et al., (2009) and Lawless and Pellegrino (2007) demonstrate that ICTs are not properly integrated into the curricula and point to the incidence of technocentric approaches. According to Mishra and Koehler (2006, p. 1033), "just knowing how to use technology is not the same as knowing how to teach with it. These authors indicate that technologies need to be integrated into the curricula of teacher education courses in order to help them build content knowledge, good pedagogical practices, and technical skills necessary to design and implement lessons based on rigorous standards that emphasize the strategic use of technology in support of curricular goals.

To address this approach, the TPACK model proposed by Mishra and Koeller (2006), used as a theoretical lens/analytical framework in our recent studies on training for the development of digital competencies in postgraduate education (CRUZ, 2021), has proven appropriate to support the discussion of integrating technologies into initial and postgraduate curricula in order to develop the digital competencies needed to make the qualitative leap towards innovation in educational processes.

2 Methodology

The choice of the Capes Platform for this review is due to the fact that currently the portal ensures access to the best publications in the world, constituting as the main mechanism of bibliographic support to the activities of Science, Technology, and Innovation (CT&I) (ALMEIDA, GUIMARÃES; ALVES, 2010).

Initially, a search was conducted for the main descriptors related to the theme and the objectives of this study. Although there is no specific portal where the main terms can be easily found, such as the DeCS [1] - Descriptors in Health Sciences, we organized a list of recurring terms from the keywords found in articles and other works from recognized and reputable databases, among them, the Digital Library of Theses and Dissertations, Scielo and the Capes Periodicals portal, resulting in the list as presented in Chart 1.

Table 1. Keywords and their variations

	PORTUGUESE	**ENGLISH**
Teacher Education	Formação de Professores	*Teacher training*
	Formação inicial de professores	*initial teacher training*
	Competência pedagógica dos professores	*teacher pedagogical competences*
	Currículo de formação de professores	*teacher training curriculum*
Higher Education	Ensino superior	*Higher Education*
	Educação de pós-graduação	*Graduate Education*
	Egressos	*Graduate students*
Technology - digital skills	Tecnologia Educacional	*Educational technology*
	Uso de tecnologias na educação	*Informatics on education*
	Tecnologias digitais	*Digital Technologies*
	Aprendizado tecnológico	*Technology-enabled*
	Aprendizagem habilitada pela tecnologia	*Technology-enabled learning*
	Competência digital	*Digital competence*
	Competências digitais de ensino	*Digital teaching competences*
	Tecnologias Digitais de Informação e Comunicação-TDIC	*Digital information and communication Technologies*

Source: Prepared by the authors.

We chose the terms: teacher training - graduate studies - digital technologies, and aligned with the objective of this study, we refined the results found for the area of Education. Aiming at a correlation with works that approached the master's and doctorate programs, we opted to insert the tag stricto sensu, which resulted in 42 productions. This allowed us to confirm the initial impression about the incipiency of studies that specifically address the discussion about ICT in master's and doctoral programs in Education. In Figure 2 we synthesize the frequency of the themes addressed in the articles and theses analyzed.

Table 2. Matrix for selecting and reading articles by theme

OPEN CATEGORIZATION	
Use of applications and programs by teachers (Basic Education and High School or secondary school)	5
Use of Applications and Programs in Teacher Training	3
Use of technology in graduate activities	5
Digital competencies of teachers and students in higher education	10
Digital Identity in Teacher Education	2
Evaluation through ICT	3
Online training processes	6
Work outside the field of Education	5

Source: Prepared by the authors

Most of the studies found focus on initial teacher training; there is a strong tendency to evaluate the competencies of students and teachers to use digital technologies. In second place are the productions that focus on learning supported by virtual learning environments (on-line or semi-attendance courses), showing a concern with the evaluation of the design and development processes of educational practices made possible by digital media. Next appear reports of experiences that seek to evaluate the use of applications and programs in the perception of students, which signals a concern with the quality of learning using technologies.

Deepening the reading of the abstracts of all the selected papers, we excluded those that were not related to the objectives of our work and deepened the analysis of 10 papers that brought significant contributions to our reflections, considering the direct approach to research developed in the context of post-graduation stricto-sensu, which we will share below.

3 Multiple dimensions involving technologies in the stricto sensu postgraduation: some approaches and contributions from the results

The article by Leitinho and Dias (2015) points out the contradictions present in the organization of programs, projects, or isolated actions of pedagogical training of working teachers in Higher Education, revealing three dimensions: legal-political organization, pedagogical construction, and organizational production of the mentioned policies.

When investigating training programs in six HEIs, the authors call attention to the lack of definition of national guidelines for teacher training for teaching in Higher Education, as

well as the absence of institutional definitions that ensure their applicability. They call attention to the need to review the curricular matrices of master's and doctorate courses so that they are effectively significant for teacher training for Higher Education - in the current structure these courses emphasize only research, to the detriment of teaching.

We agree with the point made in this work regarding the need for the teacher to know and act, also, on didactic, political, and pedagogical axes, with theoretical principles that help the understanding and the overcoming of his/her practice. Digital technologies in higher education are pointed out as one of these axes, followed by other themes of equal relevance: public policies for teaching and Higher Education in Brazil; the teaching work in Higher Education; Institutional and Course Pedagogical Project; Youth and cultural diversity and access to Higher Education, Conceptions of teaching and learning; Distance education; Organization, planning, management, and evaluation of teaching and learning, among others.

Maor and Currie (2017), on the other hand, analyzed the possible contributions of the use of ICTs in the process of mentoring doctoral and master's students involving eight supervisors (mentors) and nine mentees in the areas of teacher education, educational psychology, and engineering education. Both the supervisors and the students had a high level of technology competence and had already begun to integrate these technologies into their supervision process.

The study showed that technologies when combined with participatory pedagogy enable innovative ways to create research communities by giving students the ability to co-create knowledge. This work diverged from the current literature that points to little willingness and competence of counselors regarding the adoption of Skype, Dropbox, and social media tools such as Twiter.

Reszka (2015) seeks to understand the changes that have occurred in the relationship between teachers and students in the face of digital technologies and points out that both students and teachers are permeated by psychological suffering, appearing feelings of anguish, fear and frustration, in addition to pointing out the need for spaces for permanent training in the face of accelerated changes and policies for the effective use of ICT in institutions.

According to this study, many teachers claim to have their first contact with conceptual and technical issues involving technologies and education when entering as teachers in higher education, indicating the need for structural and political readjustments. About these issues, we emphasize the need to discuss the role of technologies in educational processes, considering the historicity and subjective issues beyond the technical order that emerge from the insertion of technologies, their relations with teaching professionalism, and the challenges of creating spaces for discussion and training that address the concerns and gaps.

Henderson, Finger, and Selwyn (2016) present an exploratory study with 253 graduate students from two Australian institutions. Students were asked to complete a questionnaire containing items investigating their involvement with digital technologies, aiming to identify different forms of digital engagement.

The analysis of this data highlights the benefits and intense use of official digital technologies such as library resources, and "unofficial" ones such as social media, search tools, showing the meanings and relevance that students attribute to these practices. However, practices explicitly related to learning were reported less frequently, passive consumption of content largely overlapping rather than practices of creation or participation.

The article concludes by considering what these current forms of technological engagement lack, particularly in comparison to broader discourses about the educational potential of recent digital technologies. The considerations pointed out by this study corroborate the points coming from our research regarding the need to reorient content and programs, methodologies, and assessment in ways that promote more effective engagement around training for digital skills development (CRUZ, 2021).

By emphasizing technological engagement in the pedagogical dimension, this study reinforces the thesis presented by Cruz (2021) that the technical dimension of ICTs is preponderant in curricula. By analyzing the menus of the curricular components offered in the PPGE, it was found a range of theoretical and methodological approaches about the ICTs. In large part, it is confirmed the preponderance of the technical dimension, not necessarily about teaching how to use, but the presence of reflections from research that discuss and present results of the use of specific tools or resources.

Rokenes and Krumsvik (2014) point out specific contributions to the field of English language teaching, highlighting important aspects for the reflection on technological tools and their real possibilities of use in the classroom of a group of graduate students. This study highlighted the importance of practical experimentation, that is, instead of just presenting instructions on how ICTs could be used in English Language Teaching, the trainers provided opportunities for the teachers-in-training to actively participate in practical situations. This was through demonstrating how to potentially use ICT in teaching processes, sharing relevant experiences, as well as allowing discussion of possible ethical issues, dilemmas, and pitfalls involved with the ever-increasing digital lifestyles.

Instefjord and Munthe (2016) focus their study on the integration of professional digital competence in initial teacher education in Norway, seeking to verify the factors that directly influence this process, such as workplace support and the support offered by HEIs in qualifying for professional work in digital classrooms.

Although it deals with initial training, the contribution of this work was revealed by identifying how teacher educators, coming from graduate programs, perceive their own competencies, and how this is related to workplace support. It concludes little evidence of technology integration in curriculum documents and the prevalence of the instructional dimension, mentioned mainly in the documents in relation to structure and working methods for teachers in training and found infrequently as part of the intended learning outcomes.

It points to the need for studies focusing on the relationship between training and practice, namely field placements, as a way for practicing teachers and teachers in training to support each other in developing digital skills.

Fávero (2016) presents his thesis to the PPGEDU/UFRGS program, in the Research Line Art, Language and Curriculum, entitled: "The culture of network uses in the academy: a look of university professors, Brazilian and Italian, on the use of social media in teaching".

The research was conducted with professors of different areas, from two public and two private universities in each country - Brazil and Italy - to answer a semi-structured interview, in order to identify how professors of higher education courses consider the pedagogical use of social media in teaching.

The average percentage of professors who make an effective use of social media in education in Italian universities was 13%. In Brazilian public universities this percentage rises to 42%. The interviewed professors at Brazilian private universities do not make use of Social Networking Sites (SNS) in their teaching. From the interviews analyzed, 81% of the teachers say they consider the use of SNS important in Teaching/Learning, and 68% believe it is possible to build learning communities in the environments offered by social media.

The results of this study point to possibilities that can be added and thus subsidize the teaching, the pedagogical use of social media as a way to establish dialogical relationships with students and find alternative paths to a multidimensional education.

Lara (2016) investigated the work processes of teachers who work in the stricto sensu graduate program in Education from the incorporation of digital technologies in their daily lives. The analysis aimed to understand and highlight the meanings and senses that emerge from the tension between the movement of insertion of ICT to the possible changes in the work processes and the research subjects.

Within the methodological proposal of multiple case study, professors who work in the doctoral courses of Postgraduate Programs in Education of public, private, community, and confessional universities of the five Brazilian geographic regions participated. In a universe of 1,169 professors, the respondents align themselves between positions that denounce the

negative effects of the insertion of ICTs, especially by the extensification of work to other times and spaces of non-work, including a state of total attention to the demands that may arrive at any moment via digital and mobile technologies.

On the other hand, teachers who highlight positive aspects, such as the access to peers, contact with foreign researchers, access to information and knowledge produced in a shorter time scale and with a wider scope, resistance, and adherence, and the unfolding for their personal lives.

In the sequence we find a journal that brings together specific publications on the latest developments in the application of ICT in learning, training, research and management in higher education, the International Journal of Educational Technology in Higher Education. This journal aims to:

> provide a vehicle for scholarly presentation and information exchange among practitioners, researchers, and professionals in the field of technology-enhanced education; contribute to the advancement of scientific knowledge about the use of technology and computers in higher education...the journal accepts critical reviews on theoretical or pedagogical perspectives, new technologies, and the use of IT in higher education (https://educationaltechnologyjournal.springeropen.com/about).

In 2018, a thematic series of the journal featured papers that sought to critically analyze the impact of digital technologies on higher education. According to the editorial, beyond the instrumental issues of technologies, it aimed to develop critical analyses from different theoretical lenses ranging from media education, arts to philosophy of education, gender studies, socio-material and post humanist studies.

The information in the editorial of the aforementioned publication contributed to our reflections in that it confirmed a considerable increase in academic productions in the last five years that express critical views about education and technologies. It is no longer uncommon to find visions that have overcome the dualism, pointing the ICT as saviors or villains, pointing either the effects and negative impacts or the innovative possibilities. Critical voices in educational technologies are being incorporated into the discourses considering the social, cultural, political, and economic issues of using digital technologies in higher education.

Articles are presented that consider the implications of neuroscience for understanding educational technology, phenomenological reinterpretations of the 'affordances' of technology, and the politics of 'big data' in higher education reform. Mobile learning is reassessed and there is a critical exploration of the ideological underpinnings of national digital strategies and the pedagogical analysis of personalized and adaptive learning.

According to Castañeda and Selwyn (2018), discussions about educational technologies need to turn to conceptual questions about learning through ICTs, this is because to date they seem to have naively relied on 'popular theories' of digital learning (such as connectivism and connected learning) that do not go beyond descriptions of the organization of searching for and communicating information online.

There is an awareness that further studies of the relationships between learning and technology will have to draw on theories outside the field of educational technology, in the areas of learning sciences, first focusing on what technology-based learning is and then how learning is conceptualized in the design and deployment of technologies in universities.

With this, the latest discussions seem to recognize a recurring gap in research on technology integration in education: pedagogical issues. Castañeda and Selwyn (2018) introduce authors such as Cobo (2016), Bartolomé, Castañeda and Adell (2018), Decuypere and Simons (2016) to problematize the pedagogical foundations of technologies used in the teaching and learning process by overcoming instrumental views of educational technology.

> Paying attention to pedagogy allows us to understand that the educational use of technology is not a chaotic process with dynamics governed by chance. Instead, any educational use of technology is a complex process that is shaped, conditioned, and modified by a range of pedagogical actors and influences. All of these elements need to be known if we are to understand or improve the educational process (DECUYPERE; SIMONS, 2016, p. 380).

Finally, there are fundamental pedagogical issues that need to be investigated and questioned in order to understand the teaching and learning processes mediated by ICTs; Castañeda and Selwyn (2018) argue that critical studies of education and technologies do not imply considering the insertion of ICTs as something bad, but point out that they need to be approached as something that needs problematized, that needs epistemological commitment coupled with an open and generous spirit so that critiques are transformed into strategies and alternatives beyond instrumental issues. This also involves an active commitment to "thinking differently" about how these technologies can best be implemented in higher education settings.

Another study that greatly contributed to the present review was a meta-analysis of the issues addressed in articles published in RUSC/ETHE between 2004 and 2017 by Marín et al. (2017). Using content analysis, all 355 published articles were reviewed and analyzed according to three subsets of data: 2004-2009 (n = 134), 2010-2015 (n = 157), and 2016-2017 (n = 64), aiming to show what research was conducted in the field of educational technology in higher education during this period.

The results show that the research areas and topics covered in the published articles match the research conducted in the field as a whole in the same period (HSU; HUNG; CHING, 2013). In the first subset (2004-2009) three themes stood out: universities, education, and

technologies, coinciding with the main focus and overall scope of the journal. The fourth emerging theme in this period is the student, as subjects of the studies conducted in the field, pointing out two trends regarding their use: one is the use of ICT for teacher professional development (training).

Most authors focus on university teacher training, although some literature refers to initial teacher training. The other is the use of ICT tools for learning. Authors are concerned with the "virtualization" of education and evaluate and reflect on digital practices in education.

Some of the issues addressed related to this use are the design of Open Educational Resources (OER), the support of online learning processes or the design of different pedagogical methods with ICT (e.g., problem-based, or project-based learning). Different educational experiences with e-learning and blended learning in higher education are studied.

Student evaluation of educational innovation experiences appears as one of the most recurrent themes, demonstrating a concern with the relationship between the use of ICT and student outcomes (which intensifies in the following period).

In the 2010-2015 subset, in this period learning is the main theme, presenting itself as the central bridge between university and education. New themes gain prominence: resources and social networks showing that authors investigate the quality of learning supported by online courses, learning environments, educational resources, and educational practices. Social networking appears as one of the most popular ICT tools for higher education institutions. Building students' and teachers' competencies to use information and digital technologies is an important theme in this period, as some articles show.

In the last and most recent subset, 2016-2017, the focus of research shifts sharply to the design and development of strategies and activities with the use of digital environments and tools. The concern with methods, techniques, strategies, skills, and competencies gains relevance confirming the concern with learning problematized in previous periods.

In this context, themes related to innovation and social impacts of the use of technologies in education emerge. In this period, different educational research studies are developed, in many cases conducting digital learning-based activities - in blended learning environments or collaborative projects, and some studies related to the use of electronic assessment, performance evaluation, and teacher and student evaluation on the use of technologies emerge.

This panorama of publications, although it shows us that there is still a prevalence of studies on the use of technologies often linked to interactions and design of virtual learning

environments, shows us that we are not alone in the concern with the integration of technologies, articulating knowledge of content, pedagogy, and technology.

4 Final Considerations

At first, the bibliographical survey conducted in the CAPES platform made us assume that when we explore the implications of the discussions about technologies in the education offered in the stricto-sensu post-graduation course, we enter a complex, diverse and lacunar field.

The perspective of complexity has brought us critical positions that no longer allow us to understand the integration of ICT as a "savior of education", with innovative, unavoidable, and indispensable solutions, without considering the ambiguities, contradictions and ambivalences present in cybercultural processes. This means that it is necessary to consider the simultaneous potentiality of positive and negative aspects.

In the perspective of diversity we found a diversity of themes present in the studies and alternation in the focus of the research, confirmed mainly by the studies of RUSC / ETHE: universities, education and technologies with the focus on the changes brought about by the virtualization of education; followed by the formation of students' and teachers' competencies for the use of information and digital technologies advanced to themes linked to innovation and social impacts of the use of technologies in the field of education.

From the lacunar perspective, the survey showed that the academic productions focused on the integration of technologies in Higher Education do not discuss the curricular issues and how they should be inserted in the education, contemplating the conceptual and technical dimensions. CAPES' evaluation reports, which originated the National Postgraduation Plans (PNPG), denoted the advances already consolidated and, among the challenges to be overcome, there is the need to review the curricular models in force, in order to contemplate the training of teachers without disregarding the vocation for the training of researchers. There is no direct mention of training for the use of ICT in these documents.

The analyzed works confirm the preponderant (and necessary) concern with the technical dimension (methods, techniques, strategies, skills, and competencies), but with little evidence of articulation with the conceptual and pedagogical dimension, without which it becomes impossible to advance in the appropriation and diffusion of the potentialities of the DTIC and its repercussions in learning.

There are studies that discuss the negative effects of technologies on the teaching work, and they are joined by critical voices that point to the passive use/consumption of technological tools and social media. In contrast to them are the reports of experiences that point to promising paths that result in innovative experiences that combine technologies with participatory pedagogies, and experiences that allow the articulation of theoretical discussions with practical experimentation, accompanied by studies that evaluate and register the results.

We emphasize the incipiency of discussions of works that problematize curricular issues alongside pedagogical issues. Therefore, we defend the need to expand the discussion around theoretical references that substantiate the interaction between pedagogical knowledge and technological knowledge in the training offered at post-graduate level.

In response to the central question of this study, we conclude that the relationship between learning and technology has been treated in higher education in different ways, however, it has not been efficient in the sense of indicating the impacts for the development of digital competencies necessary for the training of teachers and researchers in the stricto sensu post-graduation course. This has reverberated in the training of teachers who work in higher education and in the professionals who work in the planning and development of educational policies, projects, and programs, consequently in basic education.

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