



Teacher Training for Curriculum ICT Integration: Contributions of *Latosensu* for Undergraduate Courses

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ABSTRACT

This article is part of the research on a training course for educators aimed at integrating technologies into the curriculum, offered in the distance modality. We aim to analyze if the experience of university professors as teachers of the Specialization Course in Education in Digital Culture (EECD) Course favored the incorporation of the discussion on the integration of Digital Information and Communication Technologies (ICT) in the undergraduate courses in which they work. This is a qualitative research based on the methodology of Content Analysis. Based on the answers of the professors wanted to infer that the experience in the course improved the work in the degrees where they work, with knowledge about new technological resources and pedagogical uses; the understanding that learning contexts are guiding the process of technology integration; and the articulations between Digital Culture and the teaching areas.

KEYWORDS

Teacher training. Digital information and communication technologies. Media-education.

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As Contribuições da Docência em Cursos *Lato Sensu* para a Integração das TDIC ao Currículo na Formação Inicial

RESUMO

Este artigo insere-se no contexto da formação continuada de professores em um curso que visa à integração das tecnologias digitais ao currículo, ofertado na modalidade a distância. Temos como objetivo analisar o quanto a vivência de docentes universitários enquanto professores do Curso de Especialização em Educação na Cultura Digital (EECD) favoreceu a incorporação da discussão sobre a integração das Tecnologias Digitais de Informação e Comunicação (TDIC) nos cursos de licenciatura em que atuam. Trata-se de uma pesquisa de caráter qualitativo pautada na metodologia de Análise de Conteúdo. Com base nas respostas dos professores pretendeu-se inferir se a docência no curso favoreceu o trabalho nas licenciaturas onde atuam, com conhecimentos sobre novos recursos tecnológicos e usos pedagógicos; aumentou a compreensão de que os contextos de aprendizagem são norteadores do processo de integração das tecnologias; ampliou as articulações entre Cultura Digital e as áreas de ensino.

PALAVRAS-CHAVE

Formação docente. Tecnologias digitais de informação e comunicação. Mídia-educação.

Las Contribuciones de la Docencia en Cursos *Lato Sensu* Para la Integración de las TDIC al Currículo en la Formación Inicial

RESUMEN

Este artículo se inserta en el contexto de la investigación sobre un Curso de formación de educadores para la integración de las tecnologías al currículo, ofrecido en la modalidad a distancia. Se trata de analizar si la vivencia de docentes universitarios como profesores del Curso CEED favoreció la incorporación de la discusión sobre la integración de las Tecnologías Digitales de Información y Comunicación (TDIC) en los cursos de licenciatura en que actúan. Se trata de una investigación de carácter cualitativo pautada en la metodología de Análisis de Contenido. Con base en las respuestas de los profesores inferir que la vivencia en el curso perfeccionó el trabajo en las licenciaturas donde actúan, con conocimientos sobre nuevos recursos tecnológicos y usos pedagógicos; la comprensión de que los contextos de aprendizaje son orientadores del proceso de integración de las tecnologías; y las articulaciones entre Cultura Digital y las áreas de enseñanza

PALABRAS CLAVE

Formación docente. Tecnologías digitales de información y comunicación. Educación en medios.

Introduction

In this article we will analyze a specialization course that aims to train educators to integrate technologies into the curriculum: the Specialization Course in Education in Digital Culture (EECD). This course was a partnership between the Federal University of Santa Catarina (UFSC) and the Ministry of Education (MEC), and was offered beginning in 2014 and extended to 2016, conducted in the long distance modality. It is part of the initiatives of the National Program of Continuing Education in Educational Technology -¹ ProInfo Integrated, aimed at the training for the didactic-pedagogical use of Digital Information and Communication Technologies (TDIC) in school everyday. Based on the understanding that the integration of TDICs should be articulated by each curricular component and by the school's collective, the EECD course sought to establish a dynamic understanding in the search for changes and transformations in pedagogical practices, promoting training based on the exploration of experiences that consider critical and creative possibilities in integrating technologies into school curricula..

Several researches indicate that the issue of technologies in education is little or nothing approached during the initial teacher training (ARAÚJO, 2004; BAHIA; DURAN, 2009; BORGES; SCHENATZ, 2014). On this issue, Arruda (2013) points out that little or almost nothing has changed regarding the structure of teacher training courses to accommodate discussions on the integration of TDICs. According to Alonso (2008), this training is often relegated to continuing education initiatives, more often to short training courses. We believe that continuing education policies, as they are developed within the structure of teacher training centers in universities, as was the experience of the EECD Course, allow a greater articulation between initial and continuing training, bringing new knowledge and contributions to the courses of tertiary education. We also consider that a significant part of the teacher's practice is constituted from their experiences by reference to their educational process. We believe, as Almeida (2014), that the experience in training processes mediated by TDIC, where teaching and learning exploit the properties and potential of these technologies for teaching, might give rise to reflections and redirections's own pedagogical practice in other spaces performance. The author points out that "from the point of view of isomorphism, training activities become a reference for the teacher's pedagogical practice aimed at integrating technologies into the curriculum" (ALMEIDA, 2014, p.31).

In this sense, in order to contribute to the reflection on teaching and the integration of the TDIC into the curriculum, this article aims to analyze how the experience of university teachers in a specialization course favored the incorporation and discussion on the integration of TDICs in the undergraduate courses in which they work.

¹The Integrated ProInfo is a training program focused on the educational and pedagogical use of Information and Communication Technologies (TIC) in school life, linked to the distribution of technological equipment in schools and the provision of content and multimedia and digital features offered by the Portal of the Professor, by TV School and DVD School, by the Public Domain and by the International Bank of Educational Objects. For more information: http://portal.mec.gov.br/index.php?option=com_content&id=13156:proinfo-integrado.

Teacher Training for the Integration of Tdics

We aim to think of teacher training for the integration of Information and Communication Digital Technologies (TDIC, in Portuguese) from a theoretical framework anchored in the field of studies of Technology philosophy, media, education, educational technology and teacher training (FEENBERG, 2003²; BELLONI, 2005; FANTIN, 2012; KOEHLER; MISHRA, 2008; HARRIS et al., 2017; TARDIF, 2012). Based on these references, we recognize TDIC as a non-neutral process (FEENBERG, 2003), but rather as representative of the driving force of today's society, and can not be thought in the margins of the social relations that engender them (BARRETO, 2012). Our understanding is that the integration of TDIC in education is not only determined by the technological dimension, but by the process of relationship between individuals and contexts of appropriation of these resources (ESPÍNDOLA; STRUCHINER; GIANNELLA, 2010).

In this perspective, we believe that teacher training needs to break with the merely instrumental use and allow a conscious appropriation of the TDIC, pondering its potentialities, limits and social determinants (FEENBERG, 2003). Barreto (2012, p. 47) considers that "the massive presence of TDIC has led to the depletion of teaching work, as well as a series of simplifications in the training processes". The integration of TDIC implies "new challenges for work and for teacher training" (BARRETO, 2012, p.51). Thus, our option is for a teacher training that integrates three dimensions: for the critical reflection of the media; with the media and on the social consequences that the media represents (BELLONI, 2005; FANTIN 2012; RIVOLTELLA, 2007).

Traditionally teacher training "...takes place on a continuum, from the teacher's family and cultural education to its formal and academic trajectory, maintaining itself as a vital process while its professional cycle takes place" (CUNHA, 2013, pp. 3-4). From this, training is more commonly organized in two stages. The first is organized through institutional processes that are shaped as the initial formation, and, after its conclusion, we have "legal and public recognition" for the exercise of the profession (CUNHA, 2013, page 4). Continuous training can be carried out along the professional path and "(...) can have different formats and duration, taking the perspective of training as a process. Both can originate in the initiative of the interested parties and can be included in institutional programs" (CUNHA, 2013, page 4). Regardless of the stage, we understand the formation of teachers as a process of systematized reflection that seeks to bring research and pedagogical practice articulated to the meaning of the teacher in society (CUNHA, 2013), constituting a community with teacher-researchers and co-researchers, in a democratic process, which promotes the construction of a "bottom-up" curriculum to promote greater equality and social justice (DINIZ-PEREIRA, 2014).

² FEENBERG, Andrew. **O que é a filosofia da tecnologia**. Tradução de Agustín Apaza. 2003. Conferência pronunciada aos estudantes universitários de Komaba, 2003, sob o título de "WhatisPhilosophyof Technology?". Available on: https://www.sfu.ca/~andrewf/Feenberg_OQueEFilosofiaDaTecnologia.pdf. Access in: 20 May 2018.

In this way, we defend the idea of a teacher training practice that fulfills its social and political function. Forming a teacher for the pedagogical integration of TDIC in education means creating a contextualized training environment, capable of enabling a relationship with the reality lived by teachers. (TEIXEIRA, 2014). This understanding is based on the field of media-education studies that has as its core a training for critical analysis, for appropriation and the use of media as an object of study and as a pedagogical tool for creation, personal expression and political participation for all citizens (BELLONI, 2010). In this sense, Belloni and Bevort (2009, p. 1083) point out that:

Media education is an essential part of the processes of socialization of the new generations, but not only that, it must also include adult populations in a conception of lifelong education. This is an essential element of the processes of production, reproduction and transmission of culture, since the media are part of contemporary culture and play an increasingly important role in it, its critical and creative appropriation being, therefore, essential for the exercise of citizenship.

The media-education deals with a double dimension: the means of pedagogy and an education for the media. That is, an education for the media, taking the TDIC as an object of study; and an education through the media, taking the TDIC as a pedagogical tool. An education through the media and through the media surpasses the instrumental formation for the use of technological resources in search of a critical appropriation of its ethical and aesthetic contents, understanding that they are interconnected processes.

In the media-education work perspective, teachers re-signify didactic-pedagogical methods and incorporated new methodological perspectives. Koehler and Mishra (2008) argue that in order to have an effective integration of the TDIC in the educational contexts, the curricular components of the different areas of knowledge should be considered as guiding principles of the process. According to the authors, when thinking about the educational possibilities of the TDIC, different knowledge is at stake: knowledge of content, pedagogical knowledge, technological knowledge and its intersections. They so characterize the Technological Pedagogical Content Knowledge (TPACK- acronym for Technological Pedagogical Content Knowledge), a conceptual system on teacher knowledge that is becoming more popular as a methodological theoretical framework both for the development of initiatives for teacher training as in academic research on the integration of TDIC in education. Coutinho (2011) states that the TPACK functions as a kind of "conceptual lens" with which one can foresee the educational technology.

The main contribution of TPACK is to bring the focus of the discussion on technology in education to the links of its pedagogical potentialities with the areas of specific knowledge. Thus, helps us perceive the influence of the epistemological natures of the areas of knowledge and different traditions of production of knowledge about the conceptions of teaching and the ways of learning that teachers have (ESPINDOLA, 2010). It also draws attention to the relationship between technologies and the production of knowledge in the different areas. When thinking about the integration of the TDIC in pedagogical practices, all these relations pointed out by TPACK are determinant. However, the relationship between TDICs and

digital culture with content areas within the TPACK framework beyond its instrumental dimension is still little discussed and deepened.

Based on the references presented, we believe that teacher training is favored when we consider the integration of TDICs into the curriculum as a process in which both pedagogical practices as well as traditional technologies and content can be rethought (ESPINDOLA; GIANNELLA; STRUCHINER, 2010). Based on this understanding, it is important to understand how teachers perceive these relationships from the experience in the EECD course.

Research context

The Specialization Course in Education in Digital Culture

The course was conceived and produced by UFSC in partnership with the Ministry of Education (MEC) and had a group of approximately 120 professionals for the preparation of the materials of the 31 proposed study nuclei during a period of two years. The authorship of the materials was carried out by university professors in partnership with teachers of basic education schools, based on the construction of scenarios - problematizing situation - that bases the presentation and discussion of the ideas of each study nucleus. Course materials³ were produced in digital and hypertextual formats, integrating several languages.

The course was offered by UFSC in the long distance modality from August 2014 to August 2016, involving educators active in the public education networks of the State of Santa Catarina, with the participation of approximately 1000 people, of which 800 were students, 32 teachers, 76 tutors, 72 course-conclusion-paper counselors, and 10 professionals responsible for coordination, academic secretariat and virtual environment support. Partnerships were established with the National Union of Education Officers (UNDIME), the State Technology Centers (NTE) and municipalities (NTM), as well as with the Laboratory of New Technologies (LANTEC/UFSC).

The structure of the course sought to provide a formative environment in which both study and critical reflection are valued, as well as experience and interaction with colleagues, favoring collective production and strengthening the relationships. The structure of the course sought to provide a formative environment in which both study and critical reflection are valued, as well as experience and interaction with colleagues, favoring collective production and strengthening the relationships of the school community. The course was structured from a Collective Action Plan (PLAC), the Basic Nuclei (NB), Specific Nuclei (NE): (22 specific

³ The materials of the Specialization in Education in Digital Culture course are available at: http://catalogo.educacaonaculturadigital.mec.gov.br/site/auth?return_url=http%3A%2F%2Fcatalogo.educacaonaculturadigital.mec.gov.br%2F and also through the mobile application "Education in Digital Culture" that can be installed on tablets and smartphones.

nuclei divided into: Kindergarten Education (1), Elementary Education I (4); Fundamental II (5), High School (9)⁴, [3] covering all disciplines of the curriculum of basic education, management (1), teacher training (1) and assistive technology (1) and Advanced Centers (NA), making the relationship of practice and theory, and conducting a Course Completion Work (CBT). In each curricular component of the course, at least one higher education teacher was responsible for conducting the discussions and pedagogical activities.

The training platform of the course was e-Proinfo, a collaborative virtual learning environment that enables the design, administration and development of several types of training actions.

Research Trajectory

In order to achieve the goal of this work, we opted for a qualitative approach, because it is about studying "[...] things in their natural settings trying to understand, or interpret, the phenomena in terms of the meanings people give them" (DENZIN; LINCOLN, 2006, p.17). We realize that teachers are subjects of knowledge, considering them collaborators and co-researchers (TARDIF, 2012). We have proposed a research in which the professors themselves explain their professional experience: if "we are reflecting on our work, we are questioning its validity, the meaning it has for us and the subjects with which we work, and to the community of which we are part and which we are building" (RIOS, 2006, p. 46).

To the participants of the EECD teaching staff, a questionnaire was sent in July 2016 via googleforms, along with a Free and Informed Consent Term, whose purpose was to understand the teaching process or the experience of the teachers in the Course.

Thirty-two teachers from different nuclei were invited to participate in the study, of which 13 teachers answered the survey questionnaire: 10 women and 3 men, 5 of whom were between 36 and 46 years, 5 between 47 and 57 years, 2 between 25 to 35 years and 1 with more than 58 years. On the level of training, 8 professors were Doctors, 1 was a PhD student, 3 were Masters and 1 was a Post-Doctor.

When asked about the education/training field, (3) stated that they have initial training in Biology, (2) Portuguese Language, (1) Pedagogy, (1) Arts, (1) Chemistry, (1) Physical Education, (1) Mathematics, (1) Foreign Language (1) Special Education and (1) Education and Curriculum. In relation to the module in which they participated in the course, three teachers worked in the PLAC module, averaging 17 hours a week, and 10 worked in specific nuclei, devoting an average of 5 hours a week.

The questionnaire was structured with 58 questions directed to evaluating the course and two questions related to this study. Thus, the guiding questions for the analysis of this

⁴ More information on the Official Website of the Course: <http://educacaonaculturadigital.mec.gov.br/>

article were: "1. After his role as teacher of the Specialization Course in Education in Digital Culture, you incorporated some elements on the integration of TDIC in the courses of teacher training" and "2. What articulations can you perceive between Digital Culture and your area of education?"

Based on teachers' questions on both issues we analyzed whether the experience of university professors as teachers of the EECDC Course favored the incorporation of the discussion about the integration of the TDIC in the undergraduate courses in which they work.

The analysis of the data was based on Content Analysis (CA), which represents a "[...] set of communication analysis techniques that uses systematic procedures and objectives for the distribution of message content" (BARDIN, 2011, P. 40). We can affirm that Content Analysis intends to infer knowledge about the conditions of production and reception of the messages; the inferences try to clarify the causes of the message or the consequences that it can provoke. And, thus, the use of CA as a research procedure is perfectly possible "... within a methodological approach that is critical and epistemologically supported by a conception of science that recognizes the active role of the subject in the production of knowledge" (FRANCO, 2012, p.10).

The categories of analysis were not defined a priori, because we wanted them to emerge from the teachers' responses so as not to generate expectations about how much the teacher's experience in the course made possible the change in their teaching practice in the undergraduate courses. Then, from a floating reading, we identified the emergent themes and constructed the categories of analysis defined a posteriori, a procedure of content analysis of the thematic type, according to Minayo (2004).

Contribution of Teaching in Lato Sensu Courses for Initial Formation

From the themes that emerged from the reading of the teachers' responses, it was possible to define four categories of analysis that represent how the experience of the teacher in the course favored reflection and integration in the teaching profession in the undergraduate courses. The categories that we will explore in this article are: (1) technological knowledge and its pedagogical uses; (2) learning contexts; (3) the relationship between TDIC and Education; (4) articulations between digital culture and teaching areas.

Knowledge of new Technological Resources and Pedagogical Uses

The answers to the questionnaire showed that the course allowed the teacher to enhance the way in which they integrate the technologies in their pedagogical practice, through applications and new pedagogies, allowing access to the tools, as Pb reports: "I

already used them. With the course, I have potentiated because I had access to differentiated tools, applications and proposals" (Pb).

In another section, we understand that the course materials constitute potential tools in educational activities, being "the mediating element between the teacher, tutor and the student, between the student and the knowledge, being a facilitator of the potential dialogue" (MARCELINO *et al.*, 2015, p.2).

Yes, he did. I have enjoyed and made a lot of use of the videos about the issue of disability, Specialized Educational Assistance and the possibilities of TA in special education and in the context of the inclusive school, as I consider important for problem-solving with teachers (P.f).

In this speech it is possible to perceive the role of didactic material in formation. In the case of Pf, the material has a role to help in the problematization of the specific field of action of the Specialized Educational Assistance, thus providing, to strengthen the integration of the technologies in their teaching practices. Gessinger et al. (2001, p.7) assists us in this reflection by stating that "the expansion of the pedagogical use of TDICs is directly related to teacher planning, its capacity to use them in favor of knowledge construction and development of student autonomy". In this sense, Almeida (2014) highlights the importance of experiencing practices with TDIC in training. The use of resources linked to a goal, planned from the knowledge area allows the reorganization of the practice, making possible the construction of new knowledge (KOEHLER; MISHRA, 2008).

Learning Contexts

In the analysis of this category it was possible to infer that, based on the experience in the course, the teachers consider that the learning contexts are guiding the process of technology integration, both with regard to the relation with the daily life of the student and their culture (Pm), and in relation to the educational needs of each curricular component (Pk): "If today we live in the midst of digital culture, my pedagogical practice should move in this direction (Pm)". "I intend to mobilize discussions on the integration of TDIC in science education, from the challenges of teaching the area (Pk)".

In this sense, we understand that the integration of TDIC in education does not have a purpose in itself, but is guided by the school's educational objectives and the different curricular components (MARCELINO *et al.*, 2015). Thus, integration in the teaching context must be committed to issues pertaining to the area of knowledge, as advocated by Koehler and Mishra (2008).

The Relationship Between TDIC and Education

For some teachers, the course promoted an understanding of the different dimensions of the teacher's work in education with the technologies, from the conception and authorship of materials and pedagogic strategies to teaching as mediator of a formative process, experiencing in practice the conception of media education:

Yes. As I participated in all the stages of this course, that is, I participated as a researcher before the course was formed, as a designer of the Management module after the course was formed, and as a teacher. I already had my conception of working with the course proposal that aims to work with/on/for the TDIC with a critical and creative look (P.m).

We realized from the analysis that the course made the experience of different roles that the teacher plays in technology-mediated education possible, which allowed an extended view of the TDIC, understanding it not only in an instrumental way, but linked to new ways of life, communication and expression. Developing and adapting didactic materials for training is a creative act "and there is integration of knowledge of various natures; pedagogical, technological and of the areas of knowledge of the curricular contents to be worked in the formative processes" (CERNY; ESPÍNDOLA, 2016, p. 484).

We cut some excerpts from the lines of the research subjects that problematize the TDIC in its relationship with digital culture and education. Pf, for example, reports technology as a pedagogical tool and, later, its characteristics, implications in the way of life of society and school, which provides transformations in educational practices:

[TDIC] In addition, they are languages, tools and resources essential for teaching practice, providing access to information and as facilitators of learning (Pf). The technologies are part of the culture, reassigning meaning to the educational relations and, thus, the TDIC in education contribute to the change of educational practices with the creation of a new environment in the classroom and in the school, affecting the instances and relations involved in this process, the changes in time and space management, the relationships between teaching and learning, pedagogical support materials, and the organization and representation of information through multiple languages that they enable (P.f).

This statement shows that the teacher perceives that the TDICs have implications for school education, overcome the understanding of TDIC only as a pedagogical tool, relating it to the social and institutional culture, the new relations of teaching production and educational processes, walking, thus, towards what the principles of media-education defends (BELLONI, 2010).

The expanded understanding of TDICs and, consequently, the importance of integrating them into the curricula, runs counter to the perceived limits for the transfer of this training to the other spaces of action of university professors, stating that the integration of these resources in undergraduate courses is still superficial, mainly due to the lack of space on the discussion of the TDICs and on the digital culture foreseen in the menus of the referred

courses, as discussed by a considerable number of studies (BAHIA; DURAN, 2009; BORGES; SCHENATZ, 2014; ALONSO, 2008; ARRUDA, 2013).

In the last four semesters I have been using the material of the E-book in the subject of Supervised Internship in which I work. It's been interesting. Students highly praise the format and interactivity of the material. But the discussion about TDIC and digital culture in teaching is still very superficial in this small insertion in the degree, I intend to increase as possibilities arise in the curricular space of the course (Ph).

In his reflection, Pd referred to the limits of the integration of the discussions about the use of TDIC in the discipline of Supervised Internship due to the difficulties related to the technological infrastructure found in the schools that are field of internship, where the students act:

I tried to present the material to my internship students so that something could be incorporated, but in general the difficulty lies in the technological resources that the schools have (Pd).

Incorporating TDICs critically into initial and continuing teacher education is still a challenge, even in the context of higher education, given the complexity of the teaching work. Reorganizing pedagogical planning is one of the challenges posed by the entry of the TDIC in the training processes, especially in the curriculum, because it is necessary to seek to create a curricular identity of its own, contextualized and concerned with social aspects, that contemplates the transversality of education.

In this direction Almeida e Silva (2011) state that:

The teacher training for the use of TDICs is a reference for his pedagogical practice and thus the underlying conception and the practices developed in the training process are an inspiration for him to be able to incorporate TDICs into curriculum development. Therefore, the problem of the integration of TDICs in education needs to take into account the training of teachers in articulation with the pedagogical work and the curriculum, which is reconfigured in the pedagogical act by the forms of representation and production of knowledge provided by the TDIC (p.8 -9).

Almeida (2002, p. 74) points out that in order for TDICs to be integrated critically into the curriculum and pedagogical doing, it is necessary for the teacher to take possession of their intrinsic properties, to use them in their own learning and pedagogical practice; may it reflect on why and for what to use technology, how this use occurs and what contributions it can bring to the learning and development of the curriculum (ALMEIDA, 2010).

Transforming the curriculum is changing the practice of education. The relationship between theory and practice should be thought by experts and teachers, promoting dialogue between the two and extending it beyond the school systems, because only then will we learn to expand the possibilities and break the limits that guide the intrinsic questions about curriculum (MOREIRA, 2000).

Coutinho and Marino (2003) emphasize the importance of overcoming the disarticulation existing in the specificities of the disciplines and areas of knowledge, hoping

to encourage teachers to carry out collective work in search of change. According to the authors, "[...] curricular integration is effective through the theory-practice relationship, linking pedagogical everyday with theoretical reflection, in search of new theoretical and methodological paths" (COUTINHO; MARINO, 2003, p. 1743).

We found a case in which the TDICs were not yet incorporated into the teacher's pedagogical practice: "I did not incorporate, but I intend to incorporate, mainly, the use of smartphones in the classroom" (Pi).

From our analysis, we could infer that most of the respondent teachers, after acting in the course, integrated the TDIC in their teaching practices and feel motivated to integrate this practice entirely in the daily teaching. The course problematized and incorporated the use of TDICs and brought to the teachers knowledge about new technological resources and pedagogical uses. The *online* course material seems to have had a great training potential for the teachers who developed it, for those who acted in the course offer and, as Cerny and Espíndola (2016) have testified, for the educators, as it also served as a reference for a pedagogical proposal based and mediated by the TDIC.

We believe that the fact that teachers did not experience technology as a learning and teaching resource as students contributes to the difficulty in developing effective proposals for the appropriation of TDIC in their teaching practice, since the training of these professionals and the spaces in which they traditionally work are focused on the traditional model, with the privilege of using the print, oral and written language, disregarding the new forms of learning (CERNY; ESPÍNDOLA, 2016).

We also understand that learning contexts are defining the process of integrating technologies. Teachers see new uses and visions of technology, where the TDICs are much more than didactic resources, because they form a communicative system in institutions and are embedded in contemporary culture, impacting them strongly.

Links Between Digital Culture and Education Areas

We can infer that the teachers who work in the course are able to establish the relationship between the digital culture and their teaching field, when they report new contents of teaching in their subjects, new research objects and their implications for the development of knowledge in their specific area (influences and new forms of production).

When reflecting on the relationship between digital culture and teaching areas, teachers emphasize the TDIC and its productions as new necessary contents in their disciplines. Pi's speech represents the understanding of TDIC in a double dimension; not only as a pedagogical tool, but also as an object of study, where it assumes the role of new contents. In a similar sense, Pd specifies that the teaching objects of his area were profoundly altered by digital means, and the texts and discourses are in themselves the object of the

discipline and extremely involved by the TDICs that altered their forms and mechanisms of production and circulation, and it is fundamental to approach them from this perspective (ROJO; BARBOSA, 2015).

TDICs are tools and objects of study (Pl).

In the Portuguese discipline, the unit of education consists in working with the text, and the object of teaching are the genres of discourse, which points to a very close articulation with digital culture, since there are many genres and texts that circulate in media and exclusively digital media, which makes it essential to teach students to understand these texts and how their mechanisms of production work. (P.d).

As discussed by the media education, the teachers of the EECD course participating in this research perceive the TDIC and the digital culture as new contents for teaching, understanding that the current society permeated by the media requires the study of the contents of the traditional areas of education, considering the (FANTIN, 2012), through a critical analysis of the different sources of information (BELLONI, 2012). In addition, they point out that new representations of the phenomena imply in the transformation of the studied phenomenon itself, generating, therefore, new contents, since as discussed by Koehler and Mishra (2008), from the TPACK reference, technology and disciplinary content in the context of digital culture modify and limit each other, as is clear in the speech of Pd.

Still on the incorporation of new contents to the curriculum, Pk discusses the diversity of digital resources that contribute to the construction of scientific knowledge, providing autonomy for those who teach and learn:

Digital culture permeates science education through access to information and scientific knowledge, in front of the Internet and the innumerable resources that contribute to the construction of this knowledge, such as simulators, virtual reality softwares, cellular applications, collaborative writing tools, multimedia languages, etc... (Pk).

Evoking another aspect of the relationship between digital culture and its field of knowledge, Ph, also in the field of sciences, recognizes the influence of digital culture on academic research, altering the understanding of the phenomena studied and enabling new ways of understanding the objects of study in that area. It also highlights the possibilities of collective construction through shared research based on computational tools. With this, it emphasizes the implications of the TDIC for the development of knowledge in the specific area.

I perceive changes in the production form and knowledge sharing of science. In addition, the ways of learning and teaching are being modified by interaction with this new [digital] culture. The understanding of phenomena from different forms of representation and integration of structures, components, variables, modifies not only their representation, but also their understanding and openness to new ways of thinking and questioning such phenomena. The possibilities of simulation computational modeling, databases, etc ... make possible the realization of shared researches and new collective constructions [...] (P.h).

The relationship between teaching content and technologies in certain areas, such as in the field of natural sciences, is so intrinsic that authors do not refer to separate elements, but

rather to the scientific-technological phenomenon (BAZZO, 2003; LÓPEZ; CEREZO, 2004). The knowledge about this relation is part of an effective teaching with, for and about the TDIC from the TPACK perspective, when we understand the intersection between content and technology as the understanding of how technologies are relevant to science (Graham et al. 2009) and how technology, through new software / equipment, transforms knowledge production (JIMOYIANNIS, 2010). Looking to evidence this influence, Graham et al (2009) emphasizes that by allowing to visualize things that would be difficult/otherwise impossible to observe, to accelerate a representation of a natural event to create and manipulate models of phenomena, to record data that would be difficult to record without the use of TDICs and organize and view patterns in data, these technologies are changing what is knowledge and its mode of production.

Still on the production of content in his area of research, Pk emphasizes the issue of shared authorship, characteristic of digital culture (BUCKINGHAM, 2010), which implies in several authors contributing with knowledge about teaching, especially the subjects of the school space itself.

In addition, the possibility of different subjects of school to have space for the production and socialization of knowledge through the network, actions that were centralized in the past by specialists in the area, also represents one of the articulations of the digital culture with the teaching area (P. k).

It is possible to infer from the PK speech that the factor that points to being one of the articulations between digital culture and teaching area also concerns what Martins (2014) understands to be a change in the issues related to authorship in digital culture. We corroborate with the author in the sense that change "does not correspond to the complete dissolution of the author, but not to individualized authorship" (p. 52). With the network, these processes lead us to a reconfiguration of the author's role and the processes of socialization of knowledge. However, according to Pretto and Cordeiro *et al.* (2013), as we tend to share the contents of collective productions, policies reinforce and intensify "not only the restriction and control, but the true usurpation of the contents." (p. 24).

Other teachers in their assesment seem to recognize the relationship between their areas and the digital culture, but do not specify what relationship this would be, or establish it only in the perspective of new tools for teaching:

My area of teaching has traditionally been very close to the use of technologies in the classroom and closely follows the transformation of society into a Digital Culture (Pg).

The CD [Digital Culture, in Brazilian Portuguese] allows the sharing of more agile information and also chemically represent the world more creatively (P.i).

The answers show us that the professors of the EECD course presented reflections on the implications of digital culture in their specific areas of knowledge, based on their previous research and performance experiences, as well as the problematizations and experiences provided in the course. Despite the significant opening of new learning possibilities, the teachers reveal that it was possible to establish the relationship between digital culture and its area of education beyond the perspective of teaching, since the TDIC and the forms of

production, expression and socialization structured from implications for the development of specific knowledge. If they are part of the production and socialization of knowledge in the different areas, it would be natural to think of the integration of TDIC in their teaching as new content and objects of study. However, Bazzo (2007) argues that the research practices inherent in disciplinary fields are often overlooked when higher education researchers act in the teaching dimension.

A careful look at the curricular structure is necessary, thinking that the curriculum, more than solely focused on the construction of concepts, can be understood as a social practice that embraces contents, actions, experiences, procedures, cultural resources, or "The link between culture and society outside school and education; between inherited knowledge and culture and student learning; between theory (ideas, assumptions and aspirations) and possible practice, given certain conditions "(GIMENO SACRISTAN, 1999, p. 61).

To think about the curricular integration between technology and content, it is important to consider how TDICs impact and modify the disciplinary contents. Harris, Mishra, and Koehler (2009) identify three forms of this relationship, which we could perceive in a certain way also among the subjects of this research: i) the emergence of TDICs can alter the disciplinary content; ii) TDIC is not neutral in relation to its effects on cognition, and iii) technological changes enable new metaphors and languages that can be used to facilitate the understanding and study of certain content.

It is important, then, to carry out the necessary methodological transformation, which transcends the domain of technique, the skills to deal with the technologies and reaches a constructivist conception, that conceives education as an active process, of formation of the autonomous citizen, able to use as a protagonist, the means of communication available to ensure their rights and have active participation in society.

Final Considerations

We find some questions that give us clues about the importance of the topic raised in the search to understand if the experience of the teachers of the EECD Course made possible the incorporation of the discussion about the TDIC integration in the undergraduate courses in which they work.

The analysis enabled us to infer that, from the experience of the course, the teachers improved the work in the degrees where they act with knowledge about new technological resources and their pedagogical uses; with the understanding that learning contexts are guiding the process of technology integration; and with the broadening of the reflection on the TDIC relationship and education.

It was possible to perceive that, upon reflecting on the contribution of this experience to their work in other contexts, the teachers bring notes about the new technological resources and pedagogical uses, since they had access to the course materials and to the applications that enabled others forms of integration of TDIC in education. They also emphasize their understanding of the importance of learning contexts as guides to the process of integrating TDICs and, in this sense, we understand that teachers perceive, from their experiences, that the curricular integration of TDICs makes sense when they are thought from the questions of each specific content and the need of each class with those contents.

We can also infer that the group of teachers who participated in this research can establish relations that we consider important between the digital culture and its area of education when they report new contents of teaching in their disciplines; new research objects; and its implications for the development of knowledge in its specific area. In this way, we perceive that the relationship between TDIC and Education is seen in an expanded way, since teachers understand TDIC beyond its instrumental use, but also as an object of study, as a content that is part of the curriculum. And the teachers go beyond, affirming the role of the TDIC as part of the culture and as artifacts and processes that make possible changes in relationships and also to themselves.

It is important to note that some research teachers, when they relate digital culture and its areas of knowledge, recognize them only as new forms of representation of knowledge and as means of promoting learning, an important but reductionist dimension of this relationship.

The teachers confirm that the initial training does not yet address issues related to the critical integration of the TDIC into teaching, and the teachers subject to this study highlight the barriers to incorporate this subject in the undergraduate courses, especially due to the lack of curricular space guaranteed in the subjects' to the little space structure appropriate for teaching with, on and for the TDIC.

To conclude, we note that most of the teachers subject to this research incorporated the suggestion of the EECD Course to problematize current pedagogical practices, proposing a new look at the integration of TDICs, in the sense of perceiving them not only in their instrumental use, but as a new form of communication, representation and knowledge formation with the possibility of transforming the areas of teaching and of being transformed. We understand that it had, then, an improvement of the relationship between the digital culture and the teaching area of the subjects of the research, emphasizing the importance of the curricular integration of the TDIC in the degrees courses where they work.

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