EDUCATION AND DIGITAL INFORMATION AND COMMUNICATION TECHNOLOGIES: A THEORETICAL/PRACTICAL EXPERIENCE IN INITIAL TEACHER TRAINING

EDUCAÇÃO E AS TECNOLOGIAS DE INFORMAÇÃO E COMUNICAÇÃO: UMA EXPERIÊNCIA TEÓRICO/PRÁTICA NA FORMAÇÃO INICIAL DE PROFESSORES

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Abstract. This article aims to discuss the relationship between theory and practice in the initial training of teachers for the use of Digital Information and Communication Technologies (DICT), based on an experience report from a class of Education and Communication Technologies, of the course of licenciatura in pedagogy, of Tiradentes University (Unit). As procedures were qualitatively analyzed the participation of students during and after the pedagogical activities developed in this discipline, on the use of DICT in initial teacher training. The sources, the productions and the evaluations of the experience were considered through questionnaire responses. As results we find that the answers and activities contribute with the vision that the future teachers are connected in the daily by technological devices, however they face considerable challenges related to the training for the use of these technologies in teaching, in what concerns the domain of communication potentialities of mediation of DICT for teaching practices in and outside the classroom.

Keywords: Higher education; Teacher training; Technologies.

Resumo. Este artigo tem o objetivo de discutir a relação entre teoria e prática na formação inicial de professores para o uso das Tecnologias Digitais de Informação e Comunicação (TDIC), a partir de um relato de experiência de uma turma da disciplina Educação e Tecnologias da Comunicação, do curso de licenciatura em pedagogia, da Universidade Tiradentes (Unit). Como procedimentos foram analisadas qualitativamente as participações dos alunos durante e após as atividades pedagógicas desenvolvidas nesta disciplina, sobre uso das TDIC na formação inicial de professores. Foram consideradas fontes, as produções e as avaliações sobre a experiência, mediante respostas de questionário. Como resultados constatamos que as respostas e atividades contribuem com a visão de que os futuros docentes estão conectados no cotidiano por dispositivos tecnológicos, no entanto enfrentam consideráveis desafios ligados à formação para o uso dessas tecnologias na docência, no que tange ao domínio de potencialidades comunicacionais de mediação das TDIC para as práticas docentes em sala de aula e fora dela.

Palavras chave: Ensino superior; Formação docente; Tecnologias.

INTRODUCTION

Information and communication technologies (ICTs), which are now increasingly digital, have affected all fields of human life through their evolution and importance in social relations. Accompanying this evolution and importance has become both a necessity and a challenge. If we live in society it is fundamental to understand the movement and forces that work in this society, producing elements for its maintenance and/or transformation. On the other hand, following the transformation movement provoked by the technologies has become a great challenge for all, especially for the education area.

In education and more specifically in teacher training this challenge becomes much more forceful since, since modernity, education and school have been the spaces responsible for the training of subjects for both physical and intellectual work. Based on the information produced by specialists, mediated by printed technology, based on the individualism of the reader and the printing of information on the pages of the book, dependent on the teacher as interpreter and reorganizer of this information from what we defined as pedagogical strategies and teaching practices . The definition of profile, values, knowledge and skills that subjects should build to live in society were directly dependent on higher institutional forces.

From the second half of the twentieth century, with the intensification of the process of globalization of the economies and globalization of cultures, and more specifically in the first decade of the twenty-first century, there is a real transformation of this socio-educational reality. Such as the invention of writing and the press, the invention of the first mass media, analogue information and communication technologies such as radio, film and television, and the impact of digital technologies that have brought the Internet, cyberspace, cyberculture, transmissions, multimedia, transformed the ways of reading this new/old world, as well as ways to access and communicate in it.

If the technical supports are new, the mobile devices are ubiquitous, they are also the construction of the codes, the new grammars and hypertextual possibilities of (re) inventing the ways of coding and decoding, accessing, (co) constructing, presenting, consuming and using the information.

Prepared to work with the printed, more specifically with the book, training teachers to face this context of Digital Information and Communication Technologies (DICT) has become a compelling need for teacher training agencies. Studies (GOES & LINHARES, 2012; SILVA, 2012) show that initial teacher training does not yet contemplate teaching about the media and its possibilities of pedagogical mediation, it does not prepare for a pedagogic of communication (SERRES, 1998).

How to face this challenge? How can training agencies prepare teachers to act in training citizens for the information and communication society? What pedagogical strategies can be developed for this purpose in the initial teacher training courses?

This article discusses the relationship between theory and practice in initial teacher education, for the use of Digital Information and Communication Technologies (DICT) in education, with the initial training strategies of undergraduate students in pedagogy, Education and Technologies of Information and Communication, groups 2016.2 of Tiradentes University (Unit).

THE TRAINING OF TEACHERS, FROM PRINT TO DIGITAL TECHNOLOGIES.

Since the century XVI, the imprint entered the school formation in the book holder and later as a textbook. The book was used to learn content rather than information technology and social communication. If, for the school, the book contributes to the social formation of the subjects, the same does not occur with other forms of print media such as magazines and newspapers, little inserted in the learning processes formalized by the school.

For Martín-Barbero (2000, p. 58), this is a cultural issue, the book-culture disregards oral culture, and in contemporary society, it disregards the culture of audiovisuals. In this sense, the author observes,

> The problem is whether the school will be able to teach reading books not only as a point of arrival but also as a starting point for other literacy, computer science and multimedia. This implies thinking about whether the school is forming the citizen who not only knows how to read books, but also television news and computer hypertexts[1].

For the modern school the student was always considered a blank page, which would be filled with a set of values and information properly organized to the right measure for the type of citizen that modernity should have. The responsibility to "literate" or conduct this training is for the teacher, also prepared for this function, the center of the process, demanding, considering its role and its practices as fundamental.

For many children and adolescents, until the emergence of so-called mass media, and in some cases even after them, access to information, or at least scientific information and corroborated by the system, occurs only at school, through the book and the teacher. Access to this set of information depends on the domain of necessary skills, mastery of the basic language codes learned in the process of literacy and literacy, proven with the mastery of reading and writing the mother tongue.

It can be said that if the print helped to organize and expand the domain of writing as an institutionalized possibility of reading the world, with the media and, even more, with the DICT, we went beyond this line, built by the alphabet codes and went beyond. By materializing the printed narratives, adding images and sounds, we create a new language and recreate the structures of the text, the forms of narratives, the processes and paths of access, production, distribution and consumption of information. Still with codes, now more "multi" and "hyper" textual, deep and plural in its format now simpler, agile, collaborative and connective in its use.

Resuming Martín-Barbero (2000, p. 58),

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[1] Our translation of "O problema está em saber se a escola vai ser capaz de ensinar a ler livros não só como ponto de chegada, mas também de partida para outra alfabetização, a da informática e das multimídias. Isso implica pensar se a escola está formando o cidadão que não só sabe ler livros, mas também noticiários de televisão e hipertextos informáticos".

> The citizen of today asks the educational system to enable him to have access to the multiplicity of writing, languages and speeches in which the decisions that affect him are produced, whether in the field of work or in the family, political and economic sphere[2].

This context of an information society, of communication and digital, requires of the subjects, new reading skills, not only to know the codes, their form of organization for the production of meanings, but mainly to decode them as narrative, discourse, text , way of saying, of reading and writing the world. New devices, new social practices and ways of communicating meanings, new forms and spaces of access, exchange and production of information and knowledge, new structures of power, new domains and forms of domination, new forms of social, collective and the social being, new spaces and ways of teaching and learning, and new goals and competencies to educate in the century XXI.

All this points to the need to build a set of basic skills for both teachers and students, aimed at a contemporary, innovative, creative and strategic learning. Competencies that, Bernheim (2008) describes as: a) reflective and critical capacity; b) ability to solve problems; c) adaptability to new situations; d) ability to select relevant information in the areas of work, culture and exercise of citizenship, which allows him to make correct decisions; e) the capacity to continue learning in contexts of accelerated technological and sociocultural change, with the permanent expansion of knowledge; f) ability to seek intermediate spaces of connection between the contents of the various disciplines, in order to carry out projects that involve the application of knowledge or procedures specific to various subjects; g) ability to appreciate reading and writing, exercise of thought and intellectual activity, in general.

We are faced with mobile devices and multimodal technologies that mix writing, sound and image to build a new, transmissive text. A hypertext open to multiple sociocultural contexts and the infinite possibilities of reading, understanding and communicating the world. In this scenario, we ask: How do these technologies become pedagogical devices? How do they contribute and transform the spaces and ways of learning and consequently of teaching? How can they contribute to the construction of the teaching knowledge since basic education?

METHODOLOGICAL PROCESS AND ORGANIZATION OF THE DISCIPLINE EDUCATION AND COMMUNICATION TECHNOLOGIES

Evaluating experiences of teaching practices in training brings a difficulty beyond the other research methodologies, because they are the two concomitants: the doing and the evaluation occur at the same time, requiring the researcher to care about their posture and distance and / or involvement in the process. The approach of this nature has produced innumerable possibilities and methodological paths of which we highlight the contributions referring to the multireferential research proposed by Ardoino (1998) and Alves (2015). Our conception is that research, from a perspective of multireferential formation mobilizes plural knowledge and highlights a special look at the subjects' itineraries in school everyday.

In this exercise we also highlight the practice of action/reflection and reflection/action (SCHÖN, 1992), in a methodological course that emphasizes what Ribeiro and Santos (2016) define know-how, experience and learning experiences inside the university.

The construction process described here for the subject exercises the dynamics of the process of reading/thinking/doing/evaluating[3] as a practical possibility of teacher training to think and use ICT as a pedagogical device and that considers "different contexts entangled in the practical theories of academic formation, government policies, daily pedagogies, social movements, research in education, production and uses of media and experiences in cities" (RIBEIROS & SANTOS, 2016, p. 306).

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[2] Our translation of "O cidadão de hoje pede ao sistema educativo que o capacite a ter acesso à multiplicidade de escritas, linguagens e discursos nos quais se produzem as decisões que o afetam, seja no campo de trabalho como no âmbito familiar, político e econômico".

[3] On this process, Fischer (1997, p. 60-61) states "[…] supondo-se aqui que os meios de informação e comunicação controem significados e atuam decisivamente na formação dos sujeitos sociais. […] o qual se constrói através da linguagem mesma de seus produtos; de que há uma lógica discursiva nesses materiais, que opera em direção à produção de sentidos e de sujeitos sociais; e de que há uma mediação, na relação complexa entre os produtores, criadores e emissores, de um lado, e os receptores e consumidores, de outro, a qual é dada particularmente pelo modo como se estruturam os textos midiáticos" are structured.

The proposal sought to sew theory and practice from the reading wheels, guiding the foundations and initial reflections for the workshops that we describe next, along with the students' statements and evaluations; through the questionnaire and evaluation of the products created by the students during the workshops and posted in the virtual learning environment on an individual basis.

The experience analyzed here was developed in the period of 2016.2. The aim of the course was to deepen the theoretical-practical relations between the complexity of contemporary society, education and the DICT in teaching, contemplating the historical context of digital technologies, their pedagogical and social implications, as well as their mediatic languages.

With an 80-hour workload, structured in 20 face-to-face meetings, the course was organized to offer, in addition to: a) expository lectures, b) individual and group field research activities; c) reading, analysis and discussion of texts; d) practical activities with DICT; e) group dynamics and production of learning materials through digital media. This disciplinary structure had the methodological purpose that, among other things, the students understood the dimension and importance of the educational practices with the pedagogical use of the DICT and their articulation of knowledge through the teaching practice itself.

In the first meetings, the proposal of the discipline was presented, discussed and agreed upon by the students. There were 22 students, 20 females and 2 males. A text for reading followed by a challenge, a field research, a diagnostic visit, and the DICT were then suggested at a nearby school to follow the discussion of the text.

As an example of the experiences that occurred in the subject that enabled a relationship of learning through the DICT in the theoretical and practical aspects, we highlight the meeting 5, where it was possible besides the theoretical discussion about the 'National Curriculum Guidelines for Early Childhood Education' (BRASIL, 2009), a presentation by the students of the results of the visit/diagnosis on the use of DICT in schools in the region, with the objective of after the discussion of the proposed text[4], to perceive from the data collected in the visit the schools as constituting the guidelines in the educational institutions, the presence, the relation with the DICT and its use.

The reading and discussion wheels, based on a foundation text, posted in advance in the online space of the discipline provided by the University (Magister[5]) were accompanied by workshops that sought to develop skills and technical skills for use and production of a product, objects of learning, produced with various media languages, and posted in the virtual space that each student created in the Edmodo digital learning and teaching social network.

Because it is a question of multimedia productions of a didactic nature and its unfeasibility in terms of quantification, we evaluate the contents in a qualitative way. In this methodology of analysis we triangulate the answers of the questionnaires with the multimedia productions of the students in the use of the virtual space of Edmodo[6] to post and to share these experiences and the own products, results of the application, in the last class of the discipline, of an online questionnaire with open and closed questions, via Google Docs, which served as a basis in this article to understand what the participating students understood of the formative process proposed by the discipline Education and the Technologies of communication.

USE OF ICT IN INITIAL TEACHER EDUCATION: TRAINING PRACTICES

The first workshop – information literacy – aimed at students to better understand the mechanisms of access and use of information on the Internet. As a final proposal of this workshop, students had to search the Internet for a specific topic related to their future teaching practice and to start the online library in the virtual classroom created individually in Edmodo. It was also proposed a challenge for the practical and individual production of the elaboration of a digital newspaper, with themes and contents linked to the training in pedagogy.

The digital newspaper was made using Word software, the sources of the information researched were made available in the course of the material in hypertextual format, being made available/published, after finalizing, in PDF format, also in Edmodo.

The purpose of the production of digital newspapers by each student during the workshop was to motivate future teachers of pedagogy to understand the importance of Internet research, selection,

[4] Text discussed in class available in: http://ndi.ufsc.br/files/2012/02/Diretrizes-Curriculares-para-a-E-I.pdf
[5] About the Magister, access: https://wwws.unit.br/Portal/Index.jsp
[6] About the Edmodo, access: https://www.edmodo.com/about

organization, production/creation of scientific information and its dissemination/teaching materials such as strategies and how pedagogical activities involving students and teacher and the school.


Jornal Pedagógico

EDIÇÃO DA TERÇA-FEIRA

12 a 15 de Setembro de 2016 - nº 1 Jornal Pedagógico Aracaju, Sergipe

Psicomotricidade

A IMPORTÂNCIA DO MOVIMENTO NO DESENVOLVIMENTO HUMANO

De acordo com a Associação Brasileira de Psicomotricidade, podemos definir a psicomotricidade como uma ciência, onde o principal objeto de estudo é o homem e a sua descoberta do mundo interno e externo utilizando apenas o corpo em movimento. Podemos dizer que a

De acordo com Referencial Curricular Nacional para a Educação Infantil, criado pelo Ministério da Educação em

Figure 1. Print of a Digital Journal produced by one of the students of the pedagogy course.
Source: Research Record.

In this first workshop, the students reported in their questionnaire (*Table* 1) their experiences in the course of the workshop, in an open and subjective way. For them, in addition to discussing classroom theories about the use of DICT, the first workshop offered the possibility of using DICT in a more conscious way, researching, organizing and also elaborating their own didactic material, in which one could make use of these productions with their students in the classroom already in the condition of teaching. This process of empowerment in the use of DICT in teaching was fundamental in the construction of the discipline that was proposed to deepen the theoretical-practical relationship on this subject.

Table 1. Students report on the first workshop.

Key words	Student report	Identification
Discovery	"discover that it's easy to do a digital newspaper thing that I did not know existed"	Student 2
	"It was great because finding out how to make a newspaper and the internet helps us a lot to know more about the subject matter."	Student 7
Surprise	"It was wonderful to produce your own newspaper yourself. Loved it"	Student 3
Applicability	"It was very helpful, because it was something I had never done, liked and will use in the future when I am teaching"	Student 6
	"The writing workshop was very significant because I will use it with the students in the classroom."	Student 18
Challenge	"The research was directed and focused on our problem. The main challenge was to know how to use information from reliable sources, allowing a critical look at the contents available on the internet."	Student 12

Source: Research Record.

In *Table* 1, the key words (i) discovery, (ii) surprise, (iii) challenge and (iv) applicability categorize students' reports when they experience seeing/producing with DICT, possibilities worked out in school everyday. This awakening of perception regarding the relation theory/practice can be better understood in statements taken from this same questionnaire. When questioned about what they expected to learn from the beginning of the course, students emphasized at the end of the course that:

"Only the theoretical part, but I learned much more" (Student 4)

"I thought I would learn only theories" (Student 10)

"Contents of the technologies, but I did not imagine that the classes were so practical" (Student 12)

We noticed that the importance of the interrelationship between theory and practice in the learning process in relation to education and DICT was a positive factor in the students' learning that emphasized this perception and that intensified in the course of the meetings.

In the radio workshop, the second workshop, preceded by the discussion wheel on the text presented and reflected an experience of radio use in education[7]. The activities were aimed at getting students to understand the usability of radio in digital environments, as well as the practicality of producing audio / radio content, podcasting with smartphone support, and the ease of sharing and didactic use of the results of that production.

After basic information about the radio, its operation, history, the main characteristics of its language, script production techniques and its pedagogical functionality in the classroom. The challenge of this workshop was the production, in double, of a radio program. Based on previous experience, didactic productions, also posted and organized in virtual classrooms created by students in Edmodo, resulted.

With the theme in mind and structured the script, students recorded their first experience with smartphone radio and used audacity software for editing and postproduction of the program, also posted in their classroom in Edmodo. The ten topics chosen for the radio programs were: i) teenage pregnancy, ii) difficulty in public speaking, iii) drawings in childhood, iv) "Brazil is serious," v) "I already know how to read," vi) theater in children's education, vii) the importance of technology in the pedagogy course, viii) radio soap opera, ix) bullying in schools and ex) all for education.

As far as the radio program's production experience is concerned, the students reported:

Table 2. Students report on the second workshop.

Key words	Student report	Identification
Applicability	"It was a good experience because you can see that radio is an excellent alternative to work on various subjects with students in the classroom because it draws their attention very much and requires concentration and elaboration of texts and scripts."	Student 1
	"Incredible, and it will be very useful"	Student 4
	"A new experience; because it is a way of showing the content to the students"	Student 8
	"Legal, it helped me to discover a new way of working the contents and how this has influence of the environment."	Student 10
Discovery	"The workshop was very meaningful and enjoyable, we learned to use the radio in a simple way, without the need of many resources, besides providing collaborative learning experiences."	Student 12
	"was interesting because I learned that it is not as difficult as I imagined."	Student 18
	"Very interesting the most difficult and mount the skeleton after ready is just to make the recording."	Student 3

Source: Research Record.

[7] Text discussed in class available in: http://www.usp.br/nce/midiasnaeducacao/pdfs/CA_Oficina_Radio.pdf

Before even thinking about the applicability of radio in education, comes the discovery of its ease of production and use, (student speaks 18). Something of fundamental importance of the practical activities, in the process of learning, is the possibility of constructing a learning, which until then was characterized in only theorizing about it. The relationship of DICT in education since its formation presupposes, learning theory and practice and (re) constructing as a continuous process of learning always, can change some perceptions about the difficulties of using the DICT in the mediation of teaching practice. In addition, it facilitates access to the dissolution of doubts, in the dialogue of peers, between students and teachers about the meaning of doing and its pedagogical applicability, anticipating or even reducing any didactic difficulties.

In the third workshop, the audiovisual workshop, we aimed to work with students to produce and edit audiovisual learning objects, from the basic technical knowledge to produce a video, through the importance of the script and the technological supports for this procedure, to the stages of recording and editing.

With the end of the course, we corroborate the hypothesis from the first day of class, during the presentation of the school schedule, which was the workshop that generated more expectation and surprise in the students. The practice of recording videos was already affordable and even routine in the lives of much of the class. We believe that it was the workshop on the use of DICT that most approached the daily life of the subjects involved. Of the 21 students enrolled in the course only two said they did not know how to use the smartphone to record video. Among all, we highlight the following statements:

Table 3. Students report on the third workshop.

Key words	Student report	Identification
Difficulty	"It was good, although we were used to recording videos, we had a bit of difficulty editing"	Student 1
Applicability	"This was the one I liked the most, because I could give life to the characters and use the imagination, and what surprised me the most was that the children loved"	Student 2
Applicability	"This experience was surprising as a way to develop activities with students."	Student 8
Discovery	"In this workshop I understood the importance of looking at all the available resources to improve understanding and learning."	Student 12
Difficulty	"It was interesting. I learned to make the videos and to edit, I found it complicated but liked"	Student 15
Difficulty	"I confess I was a little nervous about not doing the video."	Student 16
Difficulty	"Because at first I was a little nervous. But then everything went well."	Student 20

Source: Research Record.

The action carried out after the technical discussions and presentations on how to elaborate and edit a video that could be used in a room directed to children, consisted of recording and editing, with groups of up to 4 members, and during their activity, they began to emerge difficulties and new discoveries. The videos were all recorded with smartphones. Of the total of 7 videos produced, only one was edited in the own smartphone by means of application of edition VivaVideo (a own initiative of the students), the others were edited in the computer. A microphone headset was used to capture audio.



Figure 2. Students editing video on computer during third workshop.
Source: Research Record.

Many of the students reported through this workshop that it is possible, as Student 12 reinforces, to explore the potential of available technology resources to enhance learning. In this experience, the smartphone was the most widely used resource available; whether to record videos or share via instant messaging application, WhatsApp, with the other students in the class.

After the production and editing of the videos, during the class, the students began to share the productions with everyone in the class, through a digital group created in WhatsApp for the communication of the discipline, naturally making this medium a device that enlarged the interaction.

With the questionnaire, it was possible to identify some difficulties in the use of DICT, pointed out by the students. In this process of empowerment over its use in education, Student 15 states that although he had learned to make the videos and to edit, it was complicated. Student 20 highlights his nervousness in the process, reinforcing the idea that learning with the use of DICT in education is something close and applicable in our realities, but needs to go beyond the simple everyday domain, to use it as a pedagogical device and to potentialize skills acquired in the renewed role of in-service teachers in the century XXI.

When the final moment of the discipline arrived, the students were instructed to organize the postings with the productions made during the workshops in the online environment Edmodo.

In this stage each virtual classroom was evaluated, considering the products posted there highlighting as indicators: the time of posting, the content and information of each product, the sources and characteristics of the language worked in the workshops and their pedagogical possibility for the indications of the year/series proposed by the authors.

CONSIDERATIONS

This experience of teaching practice aimed to deepen the relationship between the DICT and the area of education, especially the development of skills and abilities in literacy and multimedia literacy, which value the relationship theory and practice in the training environment.

We sought during the meetings to strengthen the relationship theory and practice, so that students could understand, contribute and transform the spaces and ways of learning and, consequently, of teaching in a context of an increasingly digital information and communication society.

At the end of the course and based on what was said by the students about their learning in the classroom, we realized in their conclusion, that it sought to approach the initial objective of the learning plan enunciated at the beginning of the classes, in order better to delve into theoretical relations/practices between the complexity of contemporary society, education and digital technologies of information and communication in the process of teaching and learning.

All these discoveries constitute learning challenges to the teacher, the student, and in this case, directly to higher education, which in the face of today's society and its hyper-fluidity of globalized knowledge, increasingly immediate and mediated through new technologies , to be directly challenged by these findings, which, as we have seen in the example of this research, are daily present in the social relations of citizenship and knowledge construction, causing the university to face the need and commitment to align itself with these changes .

During the stages of this study, we esteem the guiding teacher (our role) and the students (future teachers) to improve reflections and practices on the DICT by living with them, teaching and research.

With this experience, through the questionnaire instruments, discussion groups about the theories and products of the virtual classroom in Edmodo, we were able to contribute to our self-formation and the pluralized formation of the students in a multireferential process in which together we carry out pedagogical processes with a special look at the subjects' intinerances in the daily education and the DICT.

ACKNOWLEDGES

We are grateful to Capes and FAPITEC/SE for their full scholarship support in the master's degree for the development of this study.

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