

Digital Competencies of the Teacher in the Basic Education

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Abstract:

Digital technology generates changes in educational practices. In places where the problem of access for all has been resolved, their teachers do not use these resources. What digital competencies are needed to exchange educational practices and resources between teachers? The focus of the research was that of Basic Education teachers in Brazil. The survey analyzed 59 schools interviewing 339 teachers. The investigation took place with learning workshops in which teachers identified competencies developed or not. The most relevant data show that the competences in Information, Communication and Technological are partially developed and the pedagogical competence still needs to be developed in the teachers. They show skills to share ideas, experiences and attitudes to communicate; However, there is a lack of leadership in the networks, skills to create digital content, to know how to seek and share educational practices through educational resources.

Keywords: Digital Competence, Teacher Competence, Basic Education, Educational Resource, Educational Practice.

1. Introduction

This article discusses the digital teaching competencies in the context of teacher education in Brazil. Globalization and international treaties influenced the Brazilian educational policies, such as the Bologna Process, which began in the 1950s in Europe and originated the Faure Report of 1972 and the Delors Report of 1996. The Faure Report (1972) established the two interrelated notions of learning society and lifelong education. The Delors Report (1996) proposed an integrated vision of knowledge based on two key concepts: lifelong learning and the four pillars of education: learning to know, to do, to be and to live together (UNESCO, 2016). From these influences, professional training is understood in the context of social and international mobility, considering the diplomas and titles as validators of the knowledge of the subject, as well as personal skills that can be regarded as valid by the competent authorities (Siebiger, 2013; UNESCO, 2016).

Thus, Competencies Management, which emerged in the 1990s, was driven by the expansion of knowledge management in organizations and focused on the continuous training of employees, a concern that became part of the public service and was incorporated into government plans after 1980, especially integrating the field of education and work and bringing to the debate issues that involve professional training (Zarifian, 2001).

In this perspective, the ideas aimed at learning the work activity, gave place to the notion of professional competence, broader and general, defined by Lopes Campus & Leal Fernandes (2000) as a set of knowledge and skills that allow them the exercise of a profession with the requirements of production and employment.

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The organizations of the knowledge society have promoted more varied forms of formation, valuing a multiplicity of knowledge, cultures, and values related to an occupational spectrum, besides the formative contents that guarantee the personal development. The training contents integrate technical, humanistic and physical training when necessary, as well as the development of knowledge, skills, and attitudes (Lópes Campus & Leal Fernandes, 2000).

The logic of competences brought with it the idea of job instability and job insecurity, influenced by market impositions and the economic transformations that society is currently experiencing, generating criticism of the competencies model. The main criticism is that knowledge, transformed into the main factor of production, would be submitted to the interests of the economy and not to the interests of society, ceasing to be public patrimony and becoming private capital and no longer a collective good of general use, but a restricted access power resource (Dias & Lopes, 2003; Ricardo, 2010).

Therefore, it is necessary to establish a reflexive and critical process about the competences, which requires to identify what is competence, considering individual and specific positions, what formal and informal practices that stimulate the development of competencies and how these practices articulated with the strategic vision of the organization and the social context. individual's perspective can approach skills from the based on their abilities, professional self-development and the ability to perform tasks; or in the organizational field, through training-certification, behaviors performed and results achieved.

Identifying competencies Camargo & Freitas (2013), analyze that these present themselves under two currents: the first one of behavioral origin and represented by american authors, in which it relates competence with the necessary qualifications - knowledge, skills, and attitudes - to perform tasks. The Second, considered constructivist, associates capability with the result produced in the performance of a work and not with its qualifications.

The American authors adopt the perspective based on behavior, in which man is a consequence of influences or forces of the environment. Other authors such as Boterf (2016); Brandão (2008); Fleury & Fleury (2001), adopt the French perspective based on constructivism in which the competence of the individual in a context is the one that generates results.

Competence involves interrelated knowledge, skills, and attitudes. "Knowledge is a central aspect of any discussion of learning and can be understood as the way in which individuals and societies attach meaning to their experiences" (UNESCO, 2016, P. 20). It relates as the set of information, understanding, skills, values , and attitudes acquired through learning, linked to the cultural, social, environmental and institutional contexts where it is created and reproduced.

In Brazil, UNESCO's recommendations were the basis for the construction of educational legislation. Since the 1990s, state reforms encompassed reforms and policies for education, incorporating the social mode of production stemming from the political and economic mainstream. in the state of Paraná, teacher education policies were implemented based on The State Educational Plan (PEE), prepared with the participation of the whole society. the option for own guidelines was to counter the neoliberal thinking that permeated brazilian educational policies in the 1990s (NUPE, 2010).

In this context, teacher training evolves from the idea of training to continuing education. However, there is a lack of research to identify the needs in the preparation of teachers regarding the skills that need to be developed, especially in this moment of intense use of digital technologies. In this regard, considering the policies for professional training of teachers in brazil, it is questioned: what digital teaching competences are necessary for professional development in the knowledge and technology age?

However, the development of skills requires a continuous training plan in tune with the needs and difficulties of teachers and schools. Gatti & Barretto (2009) considers that continuing education not address these issues, due to the discontinuity of policies and lack of focus on the valorization of teacher training. In addition, there are other issues to be analyzed: lack of provision of training programs for monitoring and systematic support of teachers' pedagogical practice; the difficulty of teachers in continuing their practices with eventual innovations or the end of the program; discontinuation of the policies and guidelines of the system also makes it difficult to consolidate the progress achieved.

This research, therefore, appears to solve the gap presented. In Brazil, it has as a field of study Higher Education and basic education and, in this research, aims to investigate the digital teaching competencies in the literature and identify which of them the teachers have developed and which still need to build. Thus, research contributes to the development of new policies, taking into account the educational reality and the needs of teacher education.

2. Material And Methods

The research started with the assumption that many professionals who work in schools in paran find it difficult to share their professional practices, using virtual platforms or Open Educational Resources. Starting with the difficulty of documenting and recording your ideas, followed by the lack of knowledge of the technologies and their possibilities of use. we investigate what digital skills are needed to share educational practices and resources of brazilian basic education teachers.

The research of an exploratory nature sought examples that allow an understanding of the reality of the researched problem (Gil, 1999; Trivinos, 2009). The search sought to achieve the research objective, which was to design an array of digital teacher competencies for the sharing of practices and educational resources for use by basic education teachers.

Data were collected through teachers' self-assessment (Camargo, 2013). For the development of the research, the skills of basic education teachers in a brazilian municipality were mapped. Through the Learning Workshops, teachers were able to self-assess their knowledge, skills, and attitudes, presenting reflection based on the choice of competencies undeveloped and developed.

Workshops were held with teachers for "accessibility sampling" (Gil, 1999, P. 97)with those who would like to participate. The choice of this type of sampling happens because it is not possible to access the entire population under study, using the part of the population that is accessible at the time of the research. the data on teachers' digital competencies emerged from the literature and were used in the realization of Learning Workshops with Basic Education Teachers, specifically in elementary education ii, secondary and technical education, and youth and adult Education.

The workshops were planned to take place at times of training meetings or pedagogical meetings. Other moments were defined to realize them, due to the schedule of schools that did not anticipate an educational session. then, a new strategy was used, conducting the workshop with teachers in the time-activity moment, gathered in small groups - 2 to 5 participants, using the protocol in Chart1:

Chart1. Office Protocol

ACTIVITIES (What?)	GOAL (For What?)
1. Greetings And Presentation	Welcome
2. Contextualization on the subject of competences in the teaching field.	Present and discuss the concept of competence and problematize the need for personal and professional self-development.
3. Presentation of allegorical figures on digital skills.	Discuss the concepts of digital skills in five axes of indicators.
4. give participants a list of 20 skills (Table 4) and a blank sheet.	Reflect individually on the competencies listed in the document, from the literature.
5. A self-assessment from the list of competencies	List in writing three skills you have developed and three that you think you need to improve was made by the participants.
6. Socialization of individual reflections.	Report sharing practices you have made, be they successful or unsuccessful.
7. Evaluation of the workshop	Carried out by observation protocol, filled by an observer not participating in the workshop. however, the invited observer belonged to the professional staff of the school, occupying the role of pedagogue or employee, or even a teacher who had already held the workshop at another time or another school.
8. Closing	Thanks and regards to the workshop.

Source: Adapted from (Camargo, 2013, P. 79).

After data collection, the analysis was carried out, which allowed the treatment of the results grouped in a list of 20 competencies, with three that the teachers consider developed and three still to be developed. For the data resulting from interviews and reports, it was possible to perform the content analysis.

3. Results

From the literature review in the field of study, according to the authors (Cebrian, 2003; Gallego Et Al., 2003; INTEF, 2017; Magro, Et. Al. 2014; Meirinhos, 2006; Perrenoud, 2000; Rangel Baca, 2015) it was possible to elaborate a synthesis on the subject, resulting in a grouping of the twenty indicators of digital competence. Based on the competencies identified, a matrix was built with the results from the knowledge, skills, and attitudes related to each competency, presented in Chart2:

Chart2. Digital Teaching Competence Matrix

Competencies	Knowledge	Skills	Attitude
Technological	3. Create Digital Content.	2. Install equipment and take care of its maintenance and safety.	1. Handle productivity programs.
Information	5. Knowing information and educational services on the internet and OER. 6. Transform data into knowledge.	4. Treat information (search, selection, storage, retrieval, presentation, protection of information).	7. Select, organize and evaluate technological resources.
Communication	8. Know the media and digital communication software.	9. Sharing ideas, knowledge, and experiences. 11. Leading and coordinating networking teams.	10. Motivate yourself for communication, interaction, and collaboration in the digital environment.
Pedagogical	12. To know about the use and possibilities of applying ICT. 14. Know how to solve theoretical and technical problems.	15. Mediating cognitive development activities with ICT. 16. Assessing the use of ICT and learning processes.	13. Contribute to public domain knowledge 17. Identify aspects that cause dependence on technology.
Axiological	19. Know about the social and ethical implications of ICT.	20. Learn to collaborate and share as a team.	18. Ensure personal and professional self-development.

Source: The Authors.

This competency matrix serves as the guiding axis of the competency analysis performed in the presented research and can serve as a parameter for a new study in the area. This synthesis of the literature, especially contemplated in Rangel Baca (2015) And INTEF-España(2017), made possible the self - evaluation developed in learning workshops and allowed to carry out the analysis of existing digital skills and to improve. These categories were analyzed and identified in the annotations and narratives of the interviewees, general reference and observations.

Teachers selected three skills developed and three skills that are missing. with the results, the Tukey test at 5% was carried out, in the skills sample. the first five groups of competence most voted as developed (a, b, bc, bcd, bcde) are: Technological 1, Information 5, Axiological 18, Communication 10 and in the same group are Technological 3, Axiological 19 and Communication 9. Understands there is an attitude to handle productivity programs, to communicate, interact and collaborate in a virtual environment and keep up to date, guaranteeing personal and professional self-development; there is also knowledge about educational portals and the social and ethical implications of ict and the skills to share ideas, knowledge and experiences. table 6 shows the result of the skills developed:

Table 1. Tukey Test for the competence developed.

Tratament	Average	Significant difference
Technological 1	20,78	a
Information 5	12,00	b
Axiological 18	8,56	bc
Communication 10	7,89	bcd
Technological 3	7,78	bcde
Axiological 19	7,78	bcde
Communication 9	7,44	bcde
Information 4	7,22	bcdef
Axiological 20	7,22	bcdef
Information 6	5,00	cdef
Technological 2	4,56	cdef
Communication 8	2,89	cdef
Pedagogical 15	2,22	cdef
Communication 11	1,78	def
Pedagogical 12	1,78	def
Information 7	1,56	def
Pedagogical 13	1,44	def
Pedagogical 14	1,33	def
Pedagogical 17	1,22	ef
Pedagogical 16	0,67	f

Source: The Author.

The least mentioned in this group are the pedagogical ones 16, 17 and 14; and information 7 (f, ef, def). it implies that there is little knowledge of where to look for help to solve problems associated with the use of ICT, the ability to assess the use of ICT and the learning processes and the attitude to know the aspects that cause dependence on technology and to select, organize and evaluate technological resources.

It is important to reflect that pedagogics are essential competences for teachers and these are considered by them as less developed. This influences the use of technologies and their integration in the planning of each discipline, where the factors mentioned in the reports are taken into account, in which they state that they do not use them due to the lack of school structure or the need for specific training policies.

For the skills to be developed, the results are shown in Table 2:

Table 2. Tukey Test For Less Developed Competence.

Tratament	Average	Significant difference
Technological 2	16,22	a
Technological 3	12,33	ab
Communication 8	9,44	bc
Communication 11	9,44	bc
Pedagogical 13	8,56	bcd
Technological 1	6,22	bcde
Pedagogical 15	4,78	cde
Pedagogical 12	4,56	cde
Information4	4,44	cde
Pedagogical 17	4,44	cde

Pedagogical 14	4,11	cde
Pedagogical 16	3,78	cde
Communication 9	3,56	cde
Information 5	3,22	cde
Information 6	3,11	cde
Axiological 18	3,11	cde
Axiological 20	3,00	cde
Communication 10	2,56	de
Information 7	2,11	de
Axiological 19	0,56	e

Source: The Author

The Tukey test in Table 2 shows that the five most voted competences (a, ab, bc, bcd) Are: Technological 2 and 3, Communication 8 and 11 and, Pedagogical 13. It means to say that teachers indicate as necessary, however the skills with the installation, maintenance and security of technological equipment, knowledge about the creation of digital content and about digital communication media and software, the ability to lead and coordinate networking teams and the attitude to contribute have not yet been developed. for public domain knowledge, confirming the result mentioned earlier.

The least chosen in this group (and, from, cde) indicate that teachers consider them not important because they are already developed, which is the case of axiological 18, 19 and 20. it implies that there is a commitment to personal and professional self-development , knowledge of the social and ethical implications of ict and the ability to learn, collaborate and share as a team.

Or in the case of Information Competence 7, which was not often cited as developed or to be developed, it is understood that the attitude of selecting, organizing and evaluating technological resources is considered to be of little relevance for teachers.

4. Discussion

The five categories of competencies presented apply to any activity performed in digital media. although each skill has its specificity, all are interconnected. For example, Pedagogic competence depends on technological development. At the same time, just mastering the handling of technology does not guarantee that the teacher will be able to use it in his classes.a brief description of the five categories of digital competence follows.

4.1 Competencetechnological

Technological competence is purely instrumental and includes the knowledge to create digital content, the ability to install, maintain and protect technological equipment and the attitude to deal with productivity programs. The result shows that teachers can use productivity tools, such as text editors, to plan their classes, but they lack the technique, installation and maintenance of equipment (such as installing a printer, for example) and have difficulty creating new content, which transform information into knowledge, from research. This would give autonomy to the use of ict, which creates insecurity to integrate ict into the curriculum and address the problem in the classroom, and it is necessary to develop knowledge and skills on technological competence.

4.2 Competence in Information

The competence in Information refers to the knowledge about the information and services available in educational portals on the internet and in the REA and how to transform data into knowledge. The capacity of process data and the attitude to select, organize and evaluate technological resources.

Competence of Information proved to be developed, in particular the one that indicates that teachers know how to use educational portals and open educational resources, as they use videos and class lessons, preferably, as mentioned in the teachers' speech.

4.3 Competence in Communication

Knowledge of digital Communication media and software, ability to share ideas, education and experiences and to lead and coordinate work teams and the attitude to communicate, interact and collaborate in a digital environment. Communication skills identified as developments and development.

Research has shown that teachers can share ideas, knowledge and experiences, communicate, interact and collaborate in a digital environment, but are unaware of the potential and limitations of digital communication media and software and cannot lead and coordinate network teams.

Communicative competence allows the teacher to build an environment in which students develop complex activities in a collaborative way, which go beyond the classroom and are part of the subject's formation as a social being.

4.4 Competence Pedagogical

Pedagogical competence includes knowledge about the use and possibilities of applying ICT and solving theoretical and technical problems involving technology. The skills to integrate technological means into the curriculum, mediating cognitive development activities and assessing the use of technology and learning processes; as well as the attitudes of contributing to the public domain and identifying the technology dependent aspects.

The pedagogical competences identified by the teachers show that the mastery of technology is a decisive factor in the pedagogical action, since to integrate the curricular activities that imply the use of technology, it is first necessary to know and master it.

Pedagogical competences are those that allow teachers to integrate ICT in curricular, assessment and teaching-learning processes, in addition to their professional development. When talking about updating and professional development, the skills allow teachers to know the possibilities of using ICT in the field of education and to understand the advantages and limitations of work mediated by technology, as well as the repercussions of ICT in their area of knowledge.

4.5 Competence Axiological

Axiological competence includes knowledge about the social and ethical implications of ICT, the skills to learn in a team, collaborate and share and the attitudes to keep up to date and ensure their personal and professional self-development.

The specific result is that there is a perception of the need for constant updating, self-development, learning, sharing, and collaboration, considering that the work happens in a team. According to Meirinhos (2006), aspects of technological, professional and context domain limits collaborative learning.

In order to integrate ICT into teaching work, an open and critical attitude towards the current society and the technology, an interest in lifelong learning, a continually updating and an open approach to research are necessary to make the most of the didactic possibilities offered by ICTs and to use with prudence, safety, and ethics.

5. Conclusions

This research contributed to identify the digital teaching competences identified by brazilian basic education teachers. Analyzing the teaching activity, it was possible to identify terms and concepts regarding digital information and communication technology.

It was found that digital competence involves articulated cognitive resources (knowledge, skills, attitudes, and values) to perform tasks related to the use of available technological resources. Also access to information, processing and use of communication, the creation of digital content, the use of ICT in pedagogical activities, participation and collaborative work, attitudes and values related to information security to solve problems in different contexts (INTEF-España, 2017; Perrenoud, 2000; Rangel Baca, 2015). Inspired by the planning parameters and criteria for teacher training programs, with ICT competence for teachers standards organized by UNESCO (2009) and Marco Común De Competencia Digital Docente (INTEF-España, 2017); and based on the results of the research, it is suggested to elaborate a proposal for continuing education for the development of digital competencies for teachers of basic education.

It is understood that once teachers develop digital skills, they become confident to produce and use media and information for instructional practices, they become leaders in promoting literacy and technological literacy within the school curriculum. This increases the ability to articulate and promote teaching proposals that improve the school system and society.

In this perspective, a proposal for continuing education can develop knowledge about the possibilities of using ICT, skills in handling digital tools and attitudes that involve:

- 1) Basic and technical notion of ICT; Media And Information Literacy (AMI) - UNESCO (Technological Competence)
- 2) Deepening of knowledge (creation of digital content - Technological Competence)
- 3) Knowledge management (transforming information into knowledge - sharing - Competence in Communication and Information)
- 4) Integration of ICT into the curriculum of each discipline (Pedagogical Competence)

Still far from exhausting the subject, it is necessary to identify existing and developing competencies gaps, preferably extending the research to other regions of the Brazilian states. Ideally, the design and improvement of the digital competence assessment tool should be carried out by specialists. Future research is needed to more broadly identify the digital competencies of teachers or how these competencies can be developed.

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