Digital Competences of Teachers of Basic Education

Ms. Eloni dos Santos Perin
Master in Science, Management and Information Technology
Professor of Basic Education of the State of Paraná
Brasil

Dra. Maria do Carmo Duarte Freitas
Post doctorate in Education
University of Málaga
Professor at the Federal University of Paraná – UFPR
Department of Science and Information Management

Violeta Cebrián Robles
Facultad de Ciencias de laEducación
Universidad de Málaga
ESPAÑA

Abstract

Generating new knowledge requires professional development of teachers of basic education, with competencies to act according to the scientific-technological transformations of network communication. The objective of the research was to map existing and underdeveloped digital skills of Basic Education teachers in a Brazilian municipality. The analysis was performed by the triangulation of the literature with quantitative and qualitative data, obtained during self-evaluation of the teachers in Learning Workshops. The results show that the Technological, Information and Communication competencies are partially developed. Pedagogical competence was identified as least developed and Axiological as the most developed. The reasons given by teachers involve individual factors such as difficulties in the technology field and the integration of this into the curriculum, but also includes factors that interfere with professional self-development and the creation of digital content, such as lack of time for improvement, updating and equipment in the school training needs.

Keywords: Digital Competencies; Teaching Competencies; Basic education; Technology.

1.Introduction

As researches on the theme of 2010, no Institutional Cooperation Project for Training in Teaching Skills through Coordinated Federation Technologies, University of Malaga, New Ibero-American Space of Knowledge and the Common Space of Higher Education (ALCUE). Project AECID 2010 B / 024477/09. In continuity the project Didactic-pedagogical strategies in federated systems, parceira between Spanish and Brazilian universities, which recebeu internal financing of UFPR for training of teaching competitions gives own institution. Following came another project Study of the impact of the federated eRubrics in the evaluation of the competences in the practicum - National Plan I + D + i of Excellence 2014-17. EDU2013-41974-P. In Brazil, Higher Education and Basic Education is a field of study that aims to investigate the digital competences that Basic Education teachers have developed and still need to develop. This research considers that the demands of work in the knowledge society, conceive the worker as agent of change, with subjective, innate or acquired qualities called "know-being" by the entrepreneurial leaders, who join the knowledge and the know-how to compose the required competence for learning.

The ability to communicate, to work with others, to manage and resolve conflicts, becomes increasingly important (DELORS, 1996).

2.Conceptofcompetence

For Le Boterf (1997) apud Esteves (2009), professional knowledge is considered complex and composed of the categories of knowledge: propositional or declarative, procedural, procedural, practical and tacit, that lead us to understand the competencies of teachers, both at the level conceptual as empirical, the types of knowledge and modes of cognition associated with performance. In aptitudes defined as a set of generic traits, Le Boterf (1997) apud Esteves (2009) identifies six competences inherent to professionals who know how to manage complexity: Knowing how to act with pertinence; Know how to mobilize in a given context; Know how to combine; Know how to transpose; Know how to learn and know how to learn; Know how to commit. The idea confirms the proposal of the Delors Report (1996), in which education should be thought of based on four pillars: learning to know, learning to do, learning to live together and learning to be. Araújo (2004) perceives a relative consensus in the literature on the three dimensions of competence, knowledge, skills and attitudes, involving knowledge, which can be of several orders like know-how, technical knowledge, know-how, etc. Involves skills and know-tacit and know-how, which encompasses personal, social-communicative, and other qualities. It identifies rationalism, individualism and neopragmatism as ideas that shape the competency model, which in the educational field is known as "Pedagogy of Competencies", according to Table 1:

Table 1Competences in the philosophical basis (pedagogy of competences)

Matrix	Concept
Racionalism	Formalization of competencies, aiming at the objectives of maximizing efficiency of educational systems, meeting the demands of the productive sectors. This rationalist orientation contributes to the control of the actions of self-training and self-evaluation. The evaluation practices propose to objectively measure and classify the competencies required, acquired and those of the professional course.
Individualism	Focuses on the formative process in which the development of individual capacities is valued, to the detriment of the motor, intellectual and behavioral capacities common to all the individuals of a formative process. By this fact, the wage differences are conceived and accepted as results of individual properties and actions.
Neopragmatism	It is expressed in the definition of training objectives referenced in specific demands of the companies; in the emphasis it gives to the media and which are regarded as a security of efficacy and equity; in the utilitarian treatment that establishes with the contents of teaching, according to the need to form immediate capacities and in the promotion of processes of adaptation of the individuals to their work environments.

Source: Adapted from (Araújo, 2004)

Table 1 Competences in the philosophical basis (pedagogy of competences)

In the same line of reasoning, Veloso (2010) identifies the competencies from two research angles: the philosophical and the psychological. On the philosophical basis, it identifies rationalism, individualism and pragmatism, converging to the thinking of Araújo (2004). Already in the field of psychology, Veloso (2010) related competence to learning and classifies in conductivist / behavioral-behaviorist, functionalist and constructivist matrices. The conductivist and functionalist matrices converge in the service to the market, restricted to describe the functions and tasks of the productive processes, as a stratified preparation of human resources. This conception of the concept of competences has been criticized because of the inadequacy of the analytical definition of competencies to portray the profile of successful professionals, which they are not considered the sum of isolated competences. Also, the lack of scientific evidence that consolidates programs based on competences in relation to others (Esteves, 2009). However, studies conducted in Europe on generic competences, in several areas other than education, have elucidated the ways in which professionals become competent highlighting a set of relevant personal qualities, in addition to the scientific and technical characteristics inherent in the action (Esteves, 2009). Fragile and Shimizu (2012) also adds the phenomenological approach, presented in table 2:

Table 2 Conceptual matrixes of competences in the field of psychology

Author and year	Matrix	Source	Features - concepts
Veloso (2010)	Conductor / Behaviorist	United States	Observable behavior, focused on effective performance; achieve specific results with specific actions; characteristics to perform a job; an action, behavior or possible result to be demonstrated, observed and evaluated.
Veloso (2010)	Funcionalist	England	Interaction system and environment (relationship market, technology and social relations); part of a deductive logic; is the description of an action, conduct or result that the person must demonstrate; skills built from direct observation of performance and constitute a range of predetermined, general attributes that can be applied to different situations.
Veloso (2010)	Construtivist	France	A methodology that combines research-action and reflection-action; considers the market, the function of the sector or company and also the perceptions and the contributions of the workers in relation to the challenges and potentialities of their training.
Fragelli e Shimizu (2012).	Phenomenological	Australia	The relationship between personal attributes and requirements for work, within a given situation; is a combination of attributes of the professional with the context in which these attributes can be applied; conceptual, operational, and social dimensions.

Source: Prepared by the author.

Table 2 *Conceptual matrixes of competences in the field of psychology*

The constructivist and phenomenological matrices, when bringing the worker to the debate, contemplate broader and more critical forms of analysis of individual and generic competences, with reflections of a sociological character and not only from the point of view of the market. Some characteristics or features of competencies such as planning, team learning, autonomy, problem-based learning, and formative assessment strategies can be observed and evaluated. These resources cannot be confused with knowledge, capabilities, abilities or skills, motivations, which are the elements of effective competencies. (Esteves, 2009). Perrenoud (2013) refers to competence to deal with the overall mastery of a situation, while ability deals with a specific operation, or schemes that guide the mental operations and the concrete operations and can be resources to services of several competences.

2.1. Extending the Meaning of Teaching Competence

Competencies oppose the accumulation of information and prerequisites as an end, or knowledge unrelated to its use. Dexteralized skills and with a high degree of abstraction, such as reasoning, negotiating, searching for information, formulating hypotheses, arguing, among others, are not prioritized in teacher training programs (Thurler, 2002; Ricardo, 2010). Research on teacher competencies is related to teacher training, but the concept is still under construction, differing according to the researchers. According to a survey made in the databases through a bibliometric study, the literature has as main researchers the theme: Perrenoud (2000) in Switzerland, Tardif (2002) in Canada, Shon (1992) In the United States, Cebrian (2003; 2006) in Spain, Kunter et. al. (2013) in Germany. Perrenoud (2000) brings the idea of competences to teach as a capacity to mobilize several articulated and mobilized global cognitive resources to solve problems, or, the ability to face similar situations, mobilizing cognitive resources: knowledge, skills, micro competences, and information, values, and attitudes, schemes of perception, evaluation and reasoning. The "teacher knowledge" are defined by Tardif (2002) as practical modalities of using knowledge applied in specific situations, through behaviors and attitudes typical of what is expected to solve. Already Shon (1992) considers that the reflection on the own educational action gives the teachers to think what they do, while they do, which guarantees them a practical learning. Cebrian (2006) discusses the need to develop competencies that favor the process of creating and interpreting content, not only using technology, but knowing how to work with them in different disciplines and contexts, understanding and consuming correctly the messages produced and transmitted in a network. Still, the future teacher must have valid criteria to select, redo, restructure and adapt the technological materials to their needs, as well as create new ones. In addition to the knowledge, skills and attitudes required of teachers, Kunter et. al. (2013) consider that the motivating factor also interferes in the domain of specific situations.

Perrenoud (2000) proposed ten teaching competences from the identification of generic characteristics, implemented in training courses for teachers in France. The author is one of the main researchers who discuss the teaching by competences (Ricardo, 2010). The discussion about competencies in education goes beyond the school knowledge, specific didactic and pedagogical knowledge, which includes the lack of understanding of the management of knowledge and its use in everyday situations, such as problem situations and the activation of apprentices (Thurler, 2002). The term "professional competence" is the application of the concept to active life, particularly in the complexity that the professions require, where the domain of situations is especially dependent on the interaction of knowledge, skills, attitudes and motivation. The concept of professional competence may offer a third way to understand the success of the teacher, as an alternative to two others, the first one in which good teachers show certain stable cognitive characteristics and the second refers to attention focused on the specific knowledge of acquired during teacher training (KUNTER, et al., 2013). For the authors, professional competence considers that the specific attributes of the profession, such as knowledge, beliefs, motivation and self-regulation are key aspects that determine the success of teachers.

3. Method and results

The categorization criteria used in this research are those proposed by Bardin (2011), who provide by condensation a simplified representation of the raw data. Digital competence involves articulated cognitive resources (knowledge, skills, attitudes and values) to perform tasks related to the use of available technological resources, access to information, processing and use of communication, creation of digital content, use of ICT in activities, pedagogical, participation and collaborative work, attitudes and values related to information security to solve problems in different contexts (Perrenoud, 2007; Rangel Baca, 2015; SPAIN, 2015; 2017). The term digital competence is used to define the competencies developed by people, related to working with the use of information and communication technologies. That is, a set of knowledge, skills and attitudes required to be proficient in a digital environment. They are presented in Table 3 and subdivided into categories with terms that appeared in the literature consulted: Technological, Information, Communication, Pedagogical, Axiological.

The categories presented emerged from competencies initially identified in the literature, according to the authors Perrenoud (2000); Cebrian (2003); Gallego et. al. (2003); Meirinhos (2006); Magro et. Al (2014); Spain-BOE (2015); Rangel Baca (2015), resulting in a grouping of the twenty digital competence indicators:

Technological

1. Handling of productivity programs (operating system, word processor, spreadsheets, presentation programs, internet browser, databases);
2. Knowledge about aspects related to the installation, maintenance and safety of technological equipment, risks related to the use
3. Knowledge about the creation of digital content (audio, video, images) and their respective programs or resources and learning environments using ICT;

Information

4. Knowledge and skills for the treatment of information (database search, selection, storage, retrieval, analysis, presentation, protection of information);
5. Knowledge of information and other services offered by educational portals on the Internet and REA (Portal Day to Day Education, Teacher Portal, Virtual Libraries, among others)
6. Transformation of information into knowledge through appropriate selection of different storage options;
7. Select, organize and evaluate technological resources;

Comunication

8. Knowledge of media and digital communication software and its operation; the potentialities and limitations of collaboration in these media and the resources that can be shared;
9. Knowledge and skills necessary to establish and maintain contact with students, specialists and colleagues, in order to share ideas, knowledge and experiences that enrich the educational process;
10. Ability to communicate, interact and collaborate in a digital environment;
11. Ability to lead and coordinate networked teams, distributed in digital environments;

Pedagogical

12. Knowledge about the implications of the use and possibilities of applying ICT - Information and Communication Technologies, in teaching and learning situations;
13. Knowledge of public domain (wikis, public forums, magazines) taking into account the regulations on copyright and licensing of information publication;
14. Solving theoretical and technical problems, involving knowledge of digital and non-digital technologies;
15. Integration of technological means into the curriculum as a teaching tool and mediator of cognitive development activities;
16. The use of ICT and the learning processes that take place in these environments;
17. Knowledge of the aspects that cause dependence on technology;\

Axiological

18. Willingness to keep up-to-date and ensure personal and professional self-development;
19. Values (responsibility, honesty, respect, among others) for the socially correct use of information and technology; social and ethical implications of ICT - digital identity.
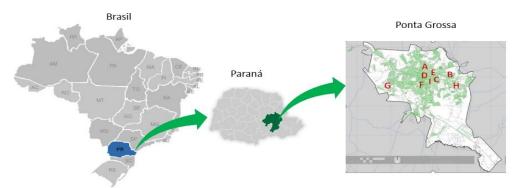20. Willingness to learn, collaborate and share as a team.

The terms used here for competency categories come from the literature and do not necessarily express the concept of each word. When it is called Pedagogical Competence, this term expresses didactic transposition using technology, as well as the integration of technology into the curriculum and the ways in which it is used for personal and professional self-development. This synthesis of the literature, especially contemplated in SPAIN - BOE (2015, 2017) and Rangel Baca (2015), was used for self evaluation in learning workshops and allowed to perform the analysis of existing digital competences and to develop, of primary school teachers. These categories were analyzed and identified in the annotations and narratives of the interviewees, theoretical reference and observations, presented below. Therefore, by uniting the categories presented, a broader concept that encompasses all the issues discussed, related to technology and digital resources, is formed.

3.1. Competences offices – teachers

The categories and their respective competency indicators were used to carry out workshops with the purpose of mapping the digital competences of the Brazilian teachers of the basic education. The research was carried out in a municipality in the interior of Brazil, according to Figure 1:

Figure 1

Source: Prepared by the author.

Search environment

Camargo's (2013) methodological strategy was adopted. After a talk about competence and presentation of the list proposed in this research, it was decided to suggest that teachers choose three competencies that they identified as more developed and three that they considered necessary to develop. The written records, identifying the competency numbers (numbered 1 to 20 - Table 3), were collected to compose the work sample. After the identification of the competences, the teachers were able to report in writing their observations, experiences using the technologies in their teaching profession. The total population of teachers in the municipality of Ponta Grossa has 59 schools and 2165 teachers (PARANÁ, 2016). To represent this population, the sample size calculation was performed, with 95% confidence level and 5% sample error, using the methodology used in Albuquerque (2012). The representative sample group indicates the use of 327 records, a number that was exceeded in the workshops, totaling 339 participating teachers.

Teachers from nine schools, identified here by letters A, B, C, D, E, F, G, H and I, participated in the workshops (Figure 1).Of the 761 teachers belonging to these nine institutions, 368 (49.3%) participated in the workshops, however, 339 (44.5%) of the total teachers in the nine schools were considered in the sample that corresponds to the self-assessment of competencies. The smallest number of answers considered in the analysis is due to the fact that teachers who did not give their registration and others who, because they worked in two or more schools, had already attended the workshop in another school. Resulting from the learning workshops, the sample number considered represents the population, making it possible to infer about the characteristics of the studied group and providing the generalization of the research. Following are the quantitative data and then the qualitative part of the research.

3.2. Quantitative data

The results of the quantitative research are illustrated in Table 3, where the three competences developed with a larger and smaller number of choices appear:

Table 3 *Competence developed among teachers*

More developed		Less developed	
Technological 1	54,8%	Pedagogical 14	3,2%
Information 5	31,8%	Pedagogical 17	3,2%
Axiological 18	22,4%	Pedagogical 16	1,7%

Source: Prepared by the author.

Competence developed among teachers

The ability to handle productivity programs is cited by 54.8% of teachers, 31.8% cite knowledge about educational portals on the Internet and Open Educational Resources, and 22.8% say they are willing to keep up to date and ensure personal and professional self-development; Pedagogical competencies are the least cited as developed.

Table 4 illustrates the competencies chosen by teachers as necessary for their development:Competence to be developed among teachers

Most cited to develop		Less cited to develop	
Technological 2	43%	Communication 10	6,7%
Technological 3	32,7%	Information 7	5,6%
Communication 8, 11	25%	Axiological 19	0,01%

Source: Prepared by the author.

Competence to be developed among teachers

Among those chosen by the largest number of teachers, there are the technological ones: 43% cite the 2. Installation, maintenance and security of technological equipment and 32.7% cites the 3. Creation of digital content; Another 25% mention the communication: 8. Knowledge of the media and digital communication software and its operation; the potentialities and limitations of collaboration in these media and the resources that can be shared; and 11. Ability to lead and coordinate networked teams, distributed in digital environments;

The results of the workshops indicate that teachers have developed technological competence, which refers to the handling of productivity programs, information competence, especially knowledge about educational portals on the Internet and the axiological ones. This demonstrates that teachers are willing to keep up-to-date and committed to their personal and professional self-development; seek to ensure the values (responsibility, honesty, respect, among others) for the socially correct use of information and technology and are willing to learn, collaborate and share as a team. The ones mentioned as less developed are pedagogical, which demonstrates the difficulty in solving theoretical and technical problems, which implies knowledge about digital and non-digital technologies; Use ICT and the learning processes that occur in these environments; and need to develop knowledge of the dependency aspects of technology. The least chosen competencies needed to develop were: 7. Select, organize and evaluate technological resources; and 10. Ability to communicate, interact and collaborate in a digital environment; which can be interpreted as unimportant for teachers.

3.3. Qualitative data

The discussions held during the learning workshops were noted by the participants interested in reporting their practices and experiences with the use of technology, reflecting on the theme of digital skills in their personal and professional context.

We discuss the data from the five categories of digital competences, crossing the theory with the teachers' reflection about their professional practice.

3.3.1. Technologicalcompetence

Regarding technological competence, teachers report that they can use the programs as word processors, spreadsheets, presentation software, video conversion and figures, which help them in the planning of their classes. However, they have limitations when it comes to the more technical part of the use of the technology, such as program installation and safety in the handling of equipment (Table 5):

Teachers' reports on technological competences

Indicator	Reporting
1. Handling productivity programs	- Within my limitations, I have used the word processor and database system; -I have ease in handling the programs as well as using them in my work -Work with these software since the age of 14 and I have been a user since the 8, and from 13 to 20 I was a teacher of windows, office, internet, corel draw, photoshop and hardware; - I do not speak much, but for not using these resources regularly; - I have a very basic knowledge of not using much; - Basic knowledge due to the use; "I got all of them out of curiosity; - Skills acquired over the years, through courses, etc.
2. Installation, maintenance and safety of technological equipment	"I do not think I have mastered because my children do when I have difficulty; - When I have a problem (with the technology) I'm looking for a technician; - I do not have much knowledge about antivirus and block advertising; - I have enough difficulty in this area and I always go to my husband who knows a lot about it, but I also have an interest in improving and learning, whenever possible I seek knowledge; - I have the facility and interest to work with technological resources;
3. Digital content creation	- Laboratory activity for the analysis of digital charts / satellite images successfully performed; - Very difficult to handle videos; no knowledge with creation; - I find it very difficult to convert videos, use images and develop classes with technological resources; - Practice related to digital skills: work on completion of a course on biopiracy - creation of digital game - creation of a blog about the environment; - A practice developed: internet use to develop research and presentation of works; - This technology becomes essential for learning in Elementary School, the student will become more knowledgeable.

Source: Prepared by the author.

Teachers' reports on technological competences

With respect to the handling of productivity programs (indicator 1), the statements express that the field of technology is related to the curiosity and use of this to the work. Indicator 2, which refers to the installation, maintenance and safety of technological equipment, expresses that those who rely on the help of others (technicians, family members) have the least developed competence. Except for those teachers who work with technology, in technical courses for example. Regarding the creation of digital content (indicator 3), teachers report that it is difficult to develop classes or create new knowledge, using technological resources. However, they cite the use of the internet for research and planning and the creation of blogs. The structure of the schools was a question raised to justify the low use of ICT for teaching, and the consequent failure to develop digital skills, as some teachers mention in different schools: I believe that the lack of structure in schools has, in my case, caused a failure, because I have the impression that my work is always incomplete (TEACHER 2, SCHOOL C).With failure the use of the cell phone in the room as a research tool (TEACHER 11, SCHOOL C).Not always the school offers an adequate structure and works to develop works / activities that involve technologies (spoiled computers, very slow internet, computer room that wet when it rains, lack of trained professionals to guide us) (TEACHER 4, SCHOOL D).

There is a great deficiency in the use of digital resources in rural schools (depending on the region) due to the structural precariousness (computer room and digital apparatus) of schools (TEACHER 21, SCHOOL D). Lack of laboratory made it difficult to search (search for information). Not even the students had internet for research, on their cell phones, for lack of credits. I ended up sharing with them my mobile 4G network (PROFESSOR 49, SCHOOL E).

How to enable the insertion of technology effectively into the curriculum, as a teaching tool, if there is no operational structure to carry out such an action? (TEACHER 63, SCHOOL E). School media, lagged, maintenance free (TEACHER 34, SCHOOL G) It is observed in the speech of the teachers who consider the structure of the school important for the use of ICT in classes. The failure in the attempt to use mobile media is a factor that influences the idea of using computer labs in the school.

3.3.2. InformationCompetence

Regarding information competence, one can see in the statements of teachers who prefer to use information already worked instead of producing content, when they use internet sites to do research and plan their classes. The action of searching the internet and using ready-made content in their classes is related to competence 5, which refers to knowledge about educational portals on the internet and Open Educational Resources (OER). This was the competence that had more prominence among those chosen as more developed. Table 7 presents the statements and observations about the information competencies reported by the teachers during the workshops.

6Teacher reports on competence in information

Indicator	Relate
4. Information processing	- I do not know how to protect information
5. Educational Portals on the Internet and REA	- I search and find a lot of material ready and these are the ones I have used in the classroom, those that are already in AVI format and can be played on the pendrive TV; - I use the internet daily to keep me updated. I use the public domain, but I do not have the time or intention for now, for research. I liked the RCO. Retreat from internet videos, quizzes for use in the room. - I spend a lot of time on several sites but I know few educational portals and I do not usually access the ones I know. Reason: I often find it easier to find the information I look for in scholarly articles and I find it annoying for educational websites that are hard to catch or are not intuitive (there are exceptions); - I have a basic knowledge, because they are sites that I visit more regularly; - Used daily in schools, both for classes and for personal use.
6. Transformation of information into knowledge	- Because my work as a teacher requires that you use the various resources. I have already used and obtained great results in the classroom.
7. Select, organize and evaluate technological resources	- Most students still see or associate a pedagogical activity involving technology with social networks like Facebook, WhatsApp, games, etc.

Source: Prepared by the author.

Teacher reports on competence in information

Regarding information processing (indicator 4), only one teacher commented on the difficulty in knowing how to protect information, such as not developed competence. The indicator with few comments indicates that questions about information processing are not clear to teachers. However, the search for information is present in the reports, when referring to indicator 5. Teachers report that they know the educational portals and use to search, especially for tests and videos, preferably ready in the same format as the available TV Pendrive, which is available in classrooms. Educational portals are also used as an upgrade, for classes or personal use. One teacher reported that he does not use educational portals and prefers to report through articles. Transforming information into knowledge (indicator 6) is a competence that was ignored in the research, due to the few existing comments. The report referring to indicator 7 - selecting, organizing and evaluating technological resources - expresses the perception about students' use of social networks. During the course of the workshop at the time of self-evaluation, some teachers asked about the OER, not associating the acronym to their action, of using available content in the educational portals, indicating the lack of knowledge about the open license for the creation and use of informational content.

3.3.3. Communication Competence

Communication competences were the least cited by teachers, considering a minimum number of reports on this topic, presented in Table 7:

Teacher reports on communication competence

Indicator	Relate
8. Digital communication media and software	- Research work is important in all disciplines. Students are invited to research on subject matter and other knowledge. - For the lack of time, ease and also frequent changes that occur in our lack of updating.
9. Share ideas, knowledge and experiences	- knowledge and skills ... (I do not use technology, but I am very communicative); - I cannot always establish and maintain contact with students and colleagues (lack of time).
10. Communicate, interact and collaborate in a digital environment	- It is almost forbidden to communicate with the student through the internet, for several reasons. - I have been a tutor online and I have a hard time interacting and making myself understood in the digital environment. I prefer eye contact. - I always use the digital environment to collaborate on my work.
11. Lead and Coordinate Networking Teams	- I have never tried to coordinate a digital team in the field of education and I do not think I would be patient enough for that; - Participation of the GTR as teacher PDE;

Source: Prepared by the author.

Teacher reports on communication competence

On the knowledge of media and digital communication software (indicator 8) teachers report on the importance of research for learning, but recognize the need for updating, limited by the lack of time and comfort.

Lack of time is also cited as a limiter of the sharing of ideas, knowledge and experiences (indicator 9). They identify that they are communicative, but that it is not always possible to maintain contact with students and colleagues through virtual means. There is insecurity in communicating and interacting with students through the internet as the speech referring to indicator 10 shows. There is also the report about the activity of tutoring, as the difficulty of understanding when expressing ideas in a digital environment. However, there is a report by using the digital environment to collaborate in the work. On leading networking teams (indicator 11), cited is the lack of patience to interact and network, but also participation in the Networking Group (GTR), as mentoring in Educational Development Program(PDE) teachers experience the momentum of leadership in a virtual environment.

3.3.4. TeachingCompetence

Pedagogical Competence is one of the most important for those who play the role of teaching. However, from the teachers' statements it is possible to observe that these are considered the least developed among the five categories. The reasons for the little development of digital pedagogical skills are cited: comfort, lack of time for improvement and updating, not being able to identify the explanations in foreign languages, difficulties in the field of technology and the curriculum itself, lack of equipment that works. The statements and observations on the Pedagogical Competencies reported by the teachers during the workshops are expressed in Table 8:

Teachers' reports on pedagogical competencies

Indicator	Reporting
12. Use and possibilities of applying ICT	- Knowledge about the implications ... (I do not master the technology); - Use of the technologies some programs in the classroom;
13. Copyright and licensing of publication of information;	- Not enough knowledge; I am looking for a part time job. - The search for improvement and enrichment in several areas is lacking; -- I believe that the lack of time and our ease do not seek improvement and updates in the technological and pedagogical area.
14. Solving theoretical and technical problems;	- Knowing where to look for help ... (I do not master the technology and when I try, explanations in foreign languages arise); "The trouble is finding someone to help you. The technology changes very quickly, we do not have time to find out. The government does not give us much resources to find out, I think the first step would be to speak a foreign language (English) because all the information and indications are in English.
15. Mediator of cognitive development activities;	- The subject curriculum itself is already difficult, I have difficulty, maybe with the help of technology improve, I believe this is an area that I still need to improve a lot; - Integrate technological means into the curriculum ... (I still think that's a good lesson with chalk and picture, well prepared, is worth more than a lot of technology without mastery, and how I do not master the technology ...); - As far as possible, I try to bring technology into the curriculum, but when some barrier relates to accessibility emerges (lack of equipment working or something similar) I end up opting for traditional teaching; - Very difficult to integrate the technological means to the contents of my discipline, to find a way of relating and using technologies;
16. ICT and learning processes	- Students come with wrong concepts about technology, they think that technology comes down to Facebook and WhatsApp

Source: Prepared by the author.

Teachers' reports on pedagogical competencies

It is observed in the statements of indicators 12, 13, 14 and 15 that there is a consensus among teachers that speaking of pedagogical competence when it comes to the use of technology is still something to be developed. The bold highlights in Table 25 illustrate this feature. Expresses that teachers have difficulty in the use and possibilities of applying ICT (indicator 12), are unaware of the copyright and licensing of information publication (indicator 13) or how to seek help to solve theoretical and technical problems in the use of (indicator 14) and has difficulty mediating cognitive development activities using ICT (indicator 15). Regarding knowledge about ICT and learning processes and dependence on technology (indicator 16), there was only one report evidencing the use of social networks by students, related to dependence. It does not make it very clear if you understand the relationship between technology and learning processes.

3.3.5. AxiologicalCompetence

Table 9 summarizes the statements and observations on the Axiological competencies reported by teachers during the workshops.

Teachers' reports on axological competencies

Indicator	Reporting
18. Personal and professional self-development	- I try to constantly update myself and in different areas; - Missing moments of learning as capacities, courses offered by the education nucleus; - Courses in EAD, by the seed and other universities;
19. Values and social and ethical implications of ICT	- Values ... (like not having responsibility, honesty, respect, are minimum rules of coexistence in society What teacher is the teacher that does not make this world a better world? - Maintain values and instruct in the correct use of technologies;
20. Learn, collaborate and share as a team	- I work very well in a team that wants to work; - I always try to be available to share and learn with my peers; - Willingness to learn in a team, collaborate and share (this is basic for the educator, I do not see how a teacher does not); - Whenever possible interactions with other people, disciplines.

Source: Prepared by the author.

Teachers' reports on axiological competences

Axiological Competences are cited as developed, demonstrating teachers' willingness to learn and self-development, considering ethical values necessary for professional practice (Rangel Baca, 2015). Regarding personal and professional self-development (indicator 18), there is perception about the need for constant updating and in diverse areas, whether Distance Education (EAD), State Secretary of Education (SEED)or Universities, but they think that they lack courses and capacities offered by SEED. On the values and ethical implications of ICT (indicator 19), the statements express the responsibility of an educator in the formation of people, for a good coexistence in society and for the correct use of technology (ethical implications). They also demonstrate that there is willingness to learn in a team, collaborate and share (indicator 20) and that this is basic for an educator.

3.4. Final considerations

The research brings to the debate about the training of teachers, the theme of teacher competencies and the need to expand training for the use of digital technologies. Thus, the literature review was based on the experiences and research developed in other countries, such as Spain, Canada and Germany. The synthesis of the literature allowed the listing of 20 digital competencies, which were used for workshops withbrazilian teachers of basic education in the State of Paraná, in the Region of Ponta Grossa. The workshops allowed to map the existing digital competences and those that still need to be developed by the teachers, from the quantitative research. The qualitative research has brought elements that reinforce the mapping of competences and identifies those activities of greater interest by the teachers. The results of qualitative research point to the need to broaden the technological training of teachers. Technological skills are partially developed, with skills for handling technological tools due to the constant use of technology for personal use and to plan their lessons and which are acquired over the years through courses and practice. However, technical knowledge is still lacking for installation, maintenance and security of equipment and creation of digital content. The use of technology is restricted to Internet searches and use of videos and images in class, as well as the use of networks for communication and social interaction. Communication skills are more related to information sharing, still lacking in development, lack of teacher time or better equipment in schools, with a network connection.

It is difficult to create digital content and transpose the didactic contents of the classes using the technology, which demonstrates the need to develop pedagogical skills, since they are more related to the author / producer of knowledge, who is able to seek information, select, organize, store, present in a transformed form, producing knowledge. Teachers search and use information ready for their classes, but also use and produce Youtube® blogs and channels, as well as developing software and producing articles, including presenting them in well-reputed magazines. However, they do not mention information protection, REAs and the transformation of information into knowledge in the reports, which indicates partially developed information, communication and pedagogical competencies. Axiological skills are identified as well developed among teachers, demonstrating that they are willing to develop personally and professionally. When identifying digital teaching competencies, it is hoped to introduce new elements in the culture of collaborative learning and information sharing for the evolution of the quality of educational practices. However, after the discussion presented, there is a need to continue studies that deepen the analysis about teachers' thinking and the mastery of the ability to install, maintain and secure equipment, for knowledge in the creation of digital content and its didactic transposition.

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