Information and Communication Technologies: Synonymous with Pedagogical Innovation in Basic Education

Alex Paubel Junger[1], Antonio Carlos de Alcantara Thimóteo[2], Maria Aparecida de Moura Amorim Sousa[3], Victor Inacio de Oliveira[4], Diogo Martins Gonçalves de Morais[5], Luciana Maia Lavio Oliveira[6], Marcelo Vianello Pinto[7], Cristiane Gomes de Carvalho Fontana[8]

[1, 2, 3, 4, 5, 6, 7, 8]*(Cruzeiro do Sul University, Brazil)*

Abstract: In times of the digital era, traditional teaching, widely used in earlier times, is now being questioned by many teachers and researchers who believe in greater teaching performance if it is enhanced by Information and Communication Technologies (ICT). Therefore, the aim of this study is to reflect on the importance of ICT as a didactic-pedagogical subsidy in Basic Education for Pedagogical Innovation. Pedagogical Innovation, in turn, seeks to introduce new teaching methods in order to compose creative and playful learning, whether through the use of active methodologies, digital technologies, among other resources that underpin a teaching that goes beyond the theoretical, beyond the notebook and the book, but to the reality of children and adolescents who today express an intense interest in education mediated by new technologies. The results of the empirical discussion developed in a bibliographical nature point out that the use of ICT in the teaching and learning processes can stimulate students for content, enable new methodologies and teaching techniques, increase the interaction and participation of students throughout the classes. Therefore, this work constitutes the direct relationship between ICT and Pedagogical Innovation as synonyms of meaningful learning in Basic Education.
Keywords: Learning; Teaching; It was digital; Digital resources.

I. Introduction

We currently live in the universe of gamification in education, active methodologies and pedagogical innovation (Godtsfriedt*et al*., 2022). The school needs new adaptations and innovations so that the exchange of knowledge is possible among teachers. Other professionals need to be included in the school, so that connections are established in the educational environment, contributing to the insurgency of discussions that emphasize the problems of the school network, shortages, class performance, new strategies, among other facets. The integration of education professionals and others who can contribute to it constitutes a list of possibilities for a collective construction of knowledge, adding values and qualification to teaching work (Giordan, 2016; Medeiros *et al*., 2022). With regard to technology-based education,

Therefore, the pedagogical process requires the active participation of teachers in the classroom, changing their roles as teachers, stimulating students towards collaborative and constitutive learning and, as a result, possibly learning successes. In face-to-face teaching, it becomes more skillful to manage the pedagogical stages, closer support to students in the execution of learning, such as greater use of physical school spaces (Ovens *et al*., 2022). In turn, remote teaching, imposed by the COVID-19 pandemic, provoked a series of adaptations for teachers and students so that they could experience a new teaching scenario, where the physical resources of the school are not used, but the technological resources. and digital. In face-to-face teaching, it is possible to control several situations, such as: dispersions of attention, parallel conversations and conflicts between students. From the perspective of remote teaching, teachers experienced a scenario of closed cameras, where students, many times, dispersed in their own family environment. In 2022/2023, the pandemic was controlled due to vaccines, requiring attention in terms of health surveillance, however, students returned to the physical classroom, allowing teachers to work on the basis of recomposing learning in order to remedy gaps arising from the pandemic.

Many authors criticize emergency remote teaching in terms of teachers' difficulties with handling technologies. However, Cunha, Mourad and Jorge (2021) point out that remote teaching is important for

guaranteeing the school year in times of crisis. The work includes a series of reflections on the challenges and potential of emergency remote teaching. Therefore, one of the most important parts of the work is attenuated in the context of the public education network in the mediation of remote teaching. While the private education network in Brazil had a greater composition of students with situations more favorable to remote teaching, the public education network used many printed materials and didactic sequences to guarantee the school year, even with the resumption of concepts already worked.

Given the context developed so far, the following problematic research question arises: is the use of digital resources in Basic Education capable of contributing to pedagogical innovation? Based on this prerogative, the objective of this study is to reflect on the importance of ICT as a didactic-pedagogical subsidy in Basic Education for Pedagogical Innovation.

II. Material And Methods

This work is developed in a qualitative research approach; the study is exploratory and investigative. A qualitative approach was stipulated, as in this work the entire discussion is not centered on quantifying articles or evaluating a number of academic productions in a given period of time, but an empirical and pedagogical discussion on the basis of the relationship between ICT and pedagogical innovation. With regard to the approach of qualitative research in education:

> In Brazil, qualitative research approaches are configured as a methodological focus from the 1970s onwards, due to epistemological concepts interpreting reality in a distorted way in their methodologies. In addition to the concern with methodology in Human Sciences and in Education, it is possible, in this historical path, to see a concern with the method more than with the problem to be studied in the context of education. The quantitative distortions are due to the precariousness of the sources, the manipulation of social information, the inaccuracy of the techniques in excluding certain variables to explain the school phenomenon, for example. In the traditional positivist conception, objectivity is desired, through quantification, as a way of eliminating distortions due to the researcher's subjectivity. In this period, this model of science starts to receive severe philosophical, political and technical criticism. The target of these criticisms was directed towards the applicability of natural science models in the Social and Human Sciences, whose theoretical principles separated facts from their historical-cultural contexts (Zanette, 2017, p. 154).

And as the investigation is exploratory, it is worth highlighting what Gil (2008, p. 27) says:

> Exploratory research has the main purpose of developing, clarifying and modifying concepts and ideas, with a view to formulating more precise problems or researchable hypotheses for further studies. Of all types of research, these are the ones with the least rigidity in planning. They usually involve bibliographical and documentary research, non-standardized interviews and case studies. Sampling procedures and quantitative data collection techniques are not usually applied in these surveys.

The data collection procedure weaves from the systematic bibliographical review, therefore, the scientific data that support the research are discussions provided by the consulted articles. The data are analyzed qualitatively, where the consulted articles constitute the theoretical structuring of the categories stipulated by the authors in essayistic molds. In the aforementioned quotation, it is possible to perceive that exploratory studies are important in the development of a new vision, a new perspective, the modification of ideas, composing new foundations in the literature. A current publication can serve as a basis for several authors, however, over time, this timeless dialogue becomes even richer, integrating different times and contexts in the process of educational development.

Research is understood as the scientific activity of questioning and constructing reality. Research is inserted in education and teaching, updating the world and its contexts. The beginning of a research comes from a problem, a query, a questioning that starts from a research spirit, followed by a bibliographic investigation, seeking to know what has been published in the literature on the subject, before structuring a method to compose a new research and add new value based on new results (Minayo, 2001). In this sense, previous knowledge should be valued, however, the knowledge of the author/researcher/writer is reflected in the research, which will directly compromise its quality or impact on society/academy.

Regarding the stages of the bibliographic review, Figure 1:

Figure 1 – Procedures and techniques for literature review.
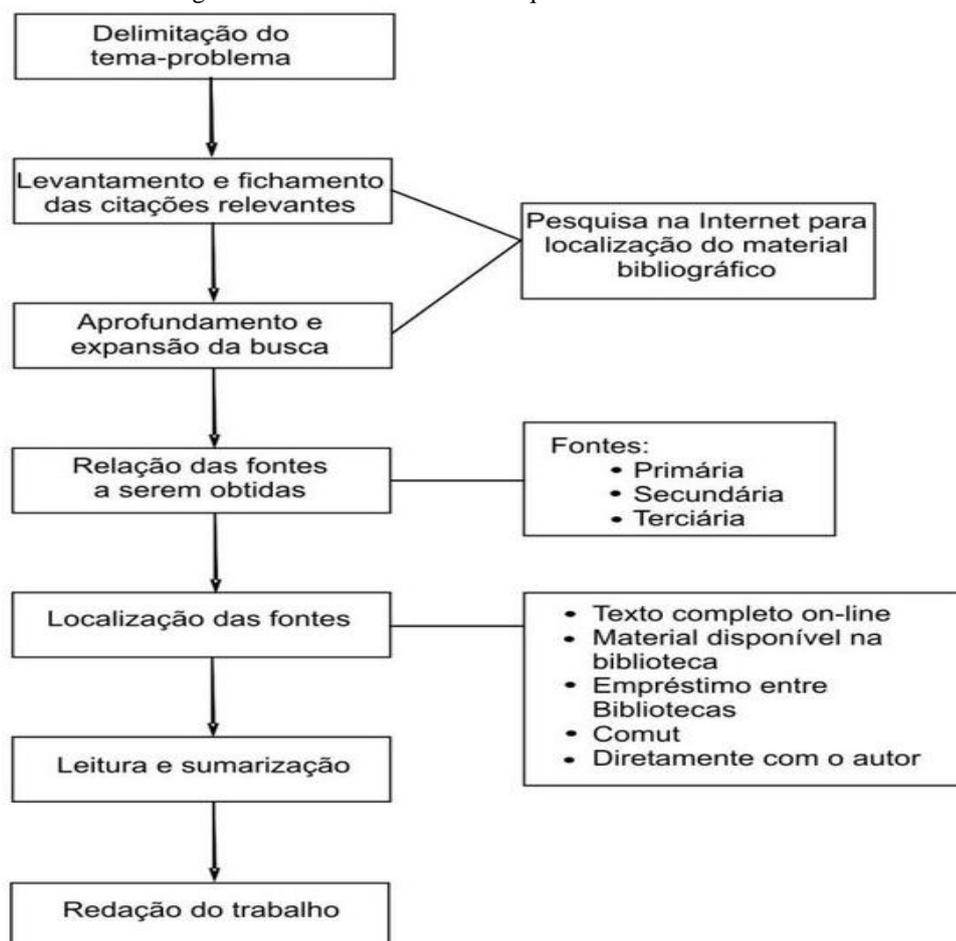
Source: Pizzani, 2012.

The stages of the research developed follow the parameters of Pizzani*et al.*, (2012). The delimitation of the problem occurs in the introduction from the context of ICT in education. Also at this stage, sources were raised to compose the bibliographic material and the presentation of the research objective. Therefore, the methodology presents the procedure for collecting and analyzing qualitative data, where the authors express their knowledge on the subject in the theoretical structure of the discussion based on categories stipulated by the authors themselves. Therefore, themainauthors that supportthisresearch are:

III. ResultsandDiscussion
3.1 Teacher training
Teacher training is one of the main mechanisms that can contribute to the quality of teaching in Basic Education. And in the meantime, Lopes andFürkotter (2016) researched on Digital Information and Communication Technologies (TDIC) in initial teacher training. Therefore, it should be noted that several different acronyms are found in the literature when addressing the themes: technology, digital resources, education and communication. The study sought to analyze the training of teachers in relation to knowledge in TDIC for use in Basic Education. The method used was the document analysis of 123 undergraduate courses from 3 public universities in São Paulo, having as research locus the curricular grids and teaching projects. In addition, six courses in the area of exact sciences at one of these universities were analyzed, having the pedagogical projects as their locus. The results showed that there are mandatory and optional subjects in the field of TDIC, however, the optional ones have a greater offer and their contents are disconnected with education. In turn, graduation in Mathematics was highlighted as a course that encourages the use of DICT in the strategy of articulation between disciplines.

The BNCC, as a guiding document for the Basic Education curriculum, provides for the following general competencies (Brasil, 2018, p. 9-10):

1. Valuing and using historically constructed knowledge about the physical, social, cultural and digital world to understand and explain reality, continue learning and collaborate in building a fair, democratic and inclusive society.
2. Exercise intellectual curiosity and resort to the approach proper to science, including investigation, reflection, critical analysis, imagination and creativity, to investigate causes, develop and test hypotheses, formulate and solve problems and create solutions (including technological ones) with based on knowledge from different areas.
3. Valuing and enjoying the various artistic and cultural manifestations, from local to global ones, and also participating in diversified practices of artistic-cultural production.
4. Using different languages – verbal (oral or visual-motor, such as Libras, and writing), corporal, visual, sound and digital –, as well as knowledge of artistic, mathematical and scientific languages, to express oneself and share information, experiences, ideas and feelings in different contexts and produce meanings that lead to mutual understanding.
5. Understand, use and create digital information and communication technologies in a critical, meaningful, reflective and ethical way in the various social practices (including school ones) to communicate, access and disseminate information, produce knowledge, solve problems and exercise protagonism and authorship in life personal and collective.
6. Valuing the diversity of knowledge and cultural experiences and appropriating knowledge and experiences that allow you to understand the relationships of the world of work and make choices aligned with the exercise of citizenship and your life project, with freedom, autonomy, critical awareness and responsibility.
7. Arguing based on reliable facts, data and information, to formulate, negotiate and defend common ideas, points of view and decisions that respect and promote human rights, socio-environmental awareness and responsible consumption at the local, regional and global level, with positioning ethical in relation to the care of oneself, others and the planet.
8. Know yourself, appreciate yourself and take care of your physical and emotional health, understanding yourself in human diversity and recognizing your emotions and those of others, with self-criticism and the ability to deal with them.
9. Exercise empathy, dialogue, conflict resolution and cooperation, respecting and promoting respect for others and human rights, welcoming and valuing the diversity of individuals and social groups, their knowledge, identities, cultures and potentialities, without prejudice of any kind.
10. Act personally and collectively with autonomy, responsibility, flexibility, resilience and determination, making decisions based on ethical, democratic, inclusive, sustainable and solidary principles.

Therefore, competence 5 stands out as promoting the use of ICT in education. One of the most important factors is that the excerpt addresses the criticality in the process of inserting technologies, that is, this mediation of teaching and technology needs to adhere to a coherence in pedagogical intentionality with the contents proposed by the curriculum. The act of solving problems and exercising protagonism is also measured, in an attempt to relate these resources with teaching by investigation, with creative teaching, with collaborative teaching.

In the current context in technological, social and cultural terms, children and adolescents have full contact with information through electronic devices, specifically with cell phones. Therefore, it is necessary to relate the teaching work and the teachers' perception of the influences of ICT on learning. Furthermore, this factor even contributes to the structuring of master's and doctoral projects, as these perceptions are important for future bibliographical research or case studies. Therefore, the contact with new media and new languages, reflect in new terms used by students that will reflect on the interaction between them at school, and could such tricks constitute teaching possibilities? The answer to this question will depend on the training and interest of teachers in knowing and applying new methodologies in their teaching planning (Liz &Quarezemin, 2014).

Menezes (2014) investigated ICT regarding the continuing education of Basic Education professionals. The study revealed some limitations; however, the collaborative pedagogical environment represented a breakthrough in the use of ICT in education. The results indicate that part of the participating teachers, working in the State Network of Basic Education of the State of Paraná, used the internet to disseminate their experiences and share their pedagogical practices with other teachers, contributing to scientific dissemination and expanding didactic-pedagogical possibilities.

Cunha, Souza and Dinardi (2022) developed a proposal for continuing education in the teaching of natural sciences. The results reveal that the course was able to add digital subsidies to the participating professors, by obtaining the QRCode of text, audio and video. In addition, some of the professors had difficulties in handling the resources, which was resolved throughout the modules, reaching successful results in handling applications and educational software.

Abreu *et al*. (2022) make an important contribution to the literature, as they investigate lives as possibilities for training in times of a pandemic. "It is possible to agree that, with the promotion and popularization of lives, due to their eclectic use, countless studies have advanced. We can even say that they were responsible, in part, for the positive results in education, where in them we share different experiences, just as in them we managed to seek solutions" (p. 11).

3.2 Pedagogical innovation and the use of ICT

Social networks, which were once used as a tool for social interaction, can now be used as teaching activities. Teaching research can be developed and stipulated by teachers to work with content involving memes, posts, videos and images. In this sense, the virtual space may be able to bring students and teachers closer together, facilitating learning, as well as expanding knowledge beyond the school universe, streamlining teaching based on debates, discussions and formalized activities (Santos &Rudnik, 2022) .

> [...] the school that participates in the digital culture and dialogues with it assumes a central role in training students with autonomy to make decisions, argue in defense of their ideas, work in groups, act in an active and questioning way in the face of events, difficulties and challenges, and participate in the social transformation movement. In this school, the potential of ICT is incorporated into its practices through the exploration of mobility, connection and multimodality, to allow student authorship, who seeks information from different sources; establishes new relationships between information, systematized knowledge and those that emerge from connections in networks or are generated in life experiences; (reconstructs) knowledge represented through multiple languages and non-linear structures;

It should be noted that digital mechanisms in teaching and online mobilizations are not resources that emerged in the pandemic, since they were previously the subject of discussions and research, however, the pandemic has enhanced these resources due to social isolation. The internet today is part of family entertainment, children's routine and the reorganization of social spheres in general. Once children lived in the universe of adults, played with each other, interacted physically, however, with the advent of the internet, physical spaces were replaced by virtual games, by chats, allowing new identities in a new universe, where children and young people are pioneers in creating and innovating new opportunities for interaction and learning. Since socasses hammocks are used by children, teenagers and young people,

The pandemic, in fact, has accelerated the increase in remote and digital mechanisms in education, in the world of work and in interaction. Therefore, the synchronous meetings made possible by platforms such as Google Meet, favor an environment similar to the face-to-face one, adhering to a pedagogical and social reception, as it allows communication in favor of teaching. Although the way of teaching is different compared to face-to-face teaching, the pandemic has awakened the attention of professionals to the need for constant training and pedagogical updating, in times where digital teaching predominates (Fischer, 2022).

Fernandes Junior *et al*. (2022) demarcates that the National Common Curricular Base (BNCC) measures the commitment of education to human and global development in intellectual, physical, affective, social, ethical, moral and symbolic dimensions. The authors point out that for the realization of this commitment to occur, it is necessary to unite efforts between the spheres of government (federal, state and municipal), seeking to minimize the fragmentation of educational policies in terms of training teachers to work in Basic Education and in Higher Education. In the field of Higher Education, in addition to graduation, master's and doctoral programs are considered as potential for research, contributing to the quality of education (Brasil, 2018; FernandesJúnior*et al*., 2022).

Seeking to relate the potential benefits of digital technologies to improving the quality of teaching and learning, Guerra *et al*. (2022) state that the insertion of these methods in Higher Education, specifically in graduation, still occur intrinsically in relation to the labor market. Thus, the authors point out that the deficit in terms of approaching ICT in education can neglect fewer opportunities in research, significant delays in innovation and impacts on the economy. Therefore, digital technology in education is associated with the world of work, since a student who does not adhere to the didactic composition to mediate teaching through technologies may not be successful in the search for teaching (Guerra *et al*. ., 2022).

And when it comes to pedagogical innovation, highlight the results obtained by Ferreira e Silva (2021, p. 221):

> Therefore, we understand that our results corroborate authors who highlight that pedagogical innovation is not just about inserting a digital instrument or not, within a classroom context, and not even that it is an individual action of the teacher, but that its completeness is achieved by adding value to the teaching and learning

process. This added value is not solely derived from the teaching effort or even from the instrument used for this, but comes from the pedagogical process as a whole. And in the meantime, the student must be placed at the center of this teaching, becoming the protagonist of his learning; and the teacher, as the mediator.

And regarding the perspective of Lévy (2008), he corroborates by pointing out the relationships between technology, society and education, because:

New ways of thinking and living together are being developed in the world of telecommunications and information technology. The relationships between men, work, the intelligences themselves depend, in fact, on the incessant metamorphosis of informational devices of all kinds. Writing, reading, seeing, hearing, creating, learning are captured by increasingly advanced information technology (Lévy, 2008, p. 7).

ICT can be associated with all this cyberculture present in the relationship between society, media, education, teaching, technologies. Digital culture is associated with the human construction arising from the transformation brought about by technologies in society. A well-known term within the digital culture is portability, which is mitigated by the innovation of devices for the cluster of functions, allowing communication, text and image editing, filming, among other digital riches that, little by little, enter the school context. . Faced with such advances, an intense movement in society acts to disseminate digital culture, therefore, education has the mission to reflect on these possibilities in teaching and pedagogical practice. I.e,

IV. Conclusion

In summary, this study aimed to reflect on the importance of ICT as a didactic-pedagogical subsidy in Basic Education for Pedagogical Innovation. In a current scenario that is heading towards the post-pandemic context, the recomposition of learning seeks to overcome the gaps in learning arising from the pandemic context. In this sense, the pandemic has accelerated the increase in digital technologies in education. As a result, the teaching and learning process in times of the digital age is mediated by new trends that attract students' attention to the construction of knowledge.

Many of the problems related to the difficulties of Basic Education teachers in using technological resources come from undergraduate courses, that is, undergraduate courses that have in their pedagogical course projects the approach to themes that permeate the use of technologies in education will have a greater performance in teaching in the networks in which they operate. Therefore, the insertion of educational technologies in undergraduate courses corroborates for excellence in teaching opportunities.

On the other hand, the results of the study indicate that there is an important relationship between the use of ICT and pedagogical innovation. Pedagogical innovation incorporates new resources that reflect on teaching methods and on the scope of creative and meaningful learning, therefore, it is necessary for teachers and managers to use subsidies in continuing education to innovate in new teaching strategies and ensure that teachers act as multipliers of digital education, using the media, the internet, cell phones, computers to provide a learning space that dialogues with the digital reality of children, adolescents and young people.

References

[1]. Abreu CG, Icaro F., Dinardi . AJ & Machado Filho, M. da M. (2022). Live: a Possibility of Training in Pandemic Times. EaDEmFoco, 12(3), e1810. https://doi.org/10.18264/eadf.v12i3.1810
[2]. Brandalise, M.A. T.. (2019). Information and communication technologies in public schools in Paraná: evaluation of an educational policy in action. EducaçãoemRevista, (35), e206349. https://doi.org/10.1590/0102-4698206349
[3]. Brazil. (2018). Common National Curriculum Base.Ministry of Education.Brasília: MEC/SEF.
[4]. Cunha, FIJ, Mourad, LAFAPM, & Jorge, WJ Emergency Remote Teaching: experience of teachers in the pandemic. Maringá: Uniedusul, 2021.
[5]. Cunha, FIJ; Souza, DV de; Dinardi, AJ (2022).Using the QRCode as a teaching-pedagogical alternative in the Teaching of Nature Sciences.Cocar Magazine, 17(25), 1-18.
[6]. Fernandes Junior, AM, Almeida, FJ de ., & Almeida, S. do CD de (2022). Brazilian research in Education on the use of technologies in High School at the beginning of the 21st century and its distancing from the construction of the BNCC. Essay: Evaluation and Public Policy in Education, 30(116), 620–643. https://doi.org/10.1590/S0104-403620220003002943

[7].   Fischer ML, Rosaneli CF, Farias MK, & Martins GZ. (2022). E-way of dialogue: virtual environments as a collective space for ethical construction. RevistaBioética, 30(2), 258–271. https://doi.org/10.1590/1983-80422022302523PT

[8].   Gil, AC (2008). Methods and techniques of social research. (6. Ed.). São Paulo: Atlas, 2008.

[9].   Giordan MZ, &Hobold MS (2016). The school as a training space for beginning teachers. Rev. Reflex. Action, 24(3), 7-25.

[10].   Godtsfriedt, J., Godtsfriedt, CES, & Cardoso, FL. (2022). Effect of an intervention with digital games and webgames on intrinsic motivation in schoolchildren. Journal of Physical Education, 33, e3325. https://doi.org/10.4025/jphyseduc.v33i1.3325

[11].   Guerra, Y., Carrara, V., & Martins, A. M. de C.. (2022). Virtual teaching and training: the new strategy of the education project at the service of capital. Revista Katálysis, 2022 25(3), 570–584. https://doi.org/10.1590/1982-0259.2022.e86938

[12].   Iannone LR, Almeida MEB, & Valente JA (2016). Research ICT Education: from inclusion to digital culture. In: Internet Management Committee in Brazil - CGI.br. Research on the use of information and communication technologies in Brazilian schools: ICT Education 2015. São Paulo: CGI.br, 55-67.

[13].   Lévy, P. (2008). The technologies of intelligence: the future of thought in the computer age. São Paulo: Editora 34

[14].   Lisboa de Liz, L., & Quarezemin, S. (2014). Training of teachers in the early years of Basic Education in the EaD modality: mother tongue teaching and the influence of Information and Communication Technologies. EducaremRevista, (special), p. 173-190.

[15].   Livingstone, S. (2013). Children's internet culture: power, change and vulnerability in twenty-first century childhood. London: Taylor & Francis.

[16].   Lopes, RP, & Fürkotter, M.. (2016). Initial teacher training in times of TDIC: an open question. Educação em Revista, 32(4), 269–296. https://doi.org/10.1590/0102-4698150675

[17].   Medeiros, O. R., Marin, M. J. S, Lazarini, C. A., Castro, R. M., &Higa, F. R. E. (2022). Teacher training in active learning methodologies.Interface - Communication, Health, Education, 26, e210577. https://doi.org/10.1590/interface.210577

[18].   Menezes, GG (2014). The use of ICT in continuing education processes and the involvement of teachers in communities of practice.Educar em Revista, (51), 283–299. https://doi.org/10.1590/S0104-40602014000100017

[19].   Minayo, MC de S. (org.). (2001). Social Research: Theory, method and creativity. 18 ed. Petropolis: Voices.

[20].   Ovens, AP, Philpot, R., & Bennett, B. (2022). Virtual learning: a self-study on evolutions in pedagogical practices. Movement, 28, e28021. https://doi.org/10.22456/1982-8918.122595

[21].   Pizzani, L., Silva, RC da, Bello, SF, &Hayashi, MCPI (2012). The art of bibliographic research in the pursuit of knowledge. RDBCI: Digital Journal of Librarianship and Information Science, 10(2), 53–66. https://doi.org/10.20396/rdbci.v10i1.1896

[22].   Santos, RO dos ., & Rudnik, RML. (2022). Instagram and education: some considerations. Brazilian Journal of Education, 27, e270099. https://doi.org/10.1590/S1413-24782022270099

[23].   Serrão, BO, Sarmento, MJ, & Santana, JP. (2022). Children's digital activism in times of a pandemic.Education&Society, 43, e257004. https://doi.org/10.1590/ES.257004

[24].   Sobrinho Junior, J. F, & Mesquita, N. A. da S. (2022). Pedagogical innovation: conceptions that orbit this concept. Reflection and Action, 30(2), 212-226. https://doi.org/10.17058/rea.v30i2.17159

[25].   Zanette, MS (2017). Qualitative research in the context of Education in Brazil.*Educar em Revista*, (65), 149–166. https://doi.org/10.1590/0104-4060.47454