ARTICLE

LEARNING PLATFORMIZATION AND THE PROTAGONISM OF HUMANS AND NON-HUMANS IN PEDAGOGICAL PRACTICES[1]

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ABSTRACT: The intervention educational policies and practices in the pandemic and post-pandemic context start to privilege the educational process focused on digital platforms and the personalization of network learning. This article aims to present the protagonism of humans and non-humans in pedagogical practices from the perspective of teachers and technical-pedagogical professionals from the State Education System of Paraíba. We conducted quantitative, qualitative, exploratory, descriptive, and analytical research. We collected the data through a multi-thematic questionnaire using the tool Google Forms. The research universe covered 19,473 effective teachers and service providers from 9 to 21 December 2021. We conclude that in addition to the debates, theories, and methods of Distance Education and Online Education, it is necessary to reinvent the teaching-learning processes through (non-human) platforms, significantly changing the ways of researching, teaching, producing, and disseminating knowledge. Pedagogical practices instituted by digital platforms are activities in which human and non-human agents work together, interact, and form alliances and bonds based on certain instituted and organized activities. Although underemployed in its educational potential, the use of digital platforms made it impossible to think of an education that excludes the internet and digital technologies.

Keywords: education; pedagogical practices; socio-materiality; platformization of education.

PLATAFORMIZAÇÃO DA APRENDIZAGEM E O PROTAGONISMO DE HUMANOS E NÃO HUMANOS NAS PRÁTICAS PEDAGÓGICAS

RESUMO: As políticas e práticas educacionais de intervenção no contexto pandêmico e pós-pandêmico passam a privilegiar o processo educacional com foco nas plataformas digitais e na personalização da aprendizagem em redes. O objetivo do artigo é apresentar o protagonismo de humanos e não humanos nas práticas pedagógicas a partir dos olhares de docentes e profissionais técnico-pedagógicos da Rede Estadual de Ensino da Paraíba. Utilizamos o método da pesquisa quantitativa e qualitativa de caráter exploratório, descritivo e analítico. Os dados apresentados foram coletados com a utilização da ferramenta Google Forms, por meio de um questionário multitemático. O universo da pesquisa abrangeu 19.473 professores efetivos e prestadores de serviço no período de 9 a 21 de dezembro de 2021. Concluímos que, para além dos debates, teorias e métodos da Educação a Distância e da Educação *Online*, é necessário reinventar processos de ensino-aprendizagem por meio das plataformas (não humanos) alterando significativamente as maneiras de pesquisar, ensinar, produzir e difundir conhecimentos. As práticas pedagógicas instituídas pelas plataformas digitais são atividades com as quais os agentes humanos e não humanos atuam em conjunto, enredados, interagindo e formando alianças e vínculos, a partir de determinadas atividades instituídas e organizadas. Ainda que subutilizadas em suas potencialidades educativas, o uso das plataformas digitais trouxe a percepção de que não é possível pensar em uma educação que exclua a *internet* e as tecnologias digitais.

Palavras-chave: educação, práticas pedagógicas, sociomaterialidade, plataformização da educação.

PLATAFORMIZACIÓN DEL APRENDIZAJE Y EL PROTAGONISMO DE HUMANOS Y NO HUMANOS EN LAS PRÁCTICAS PEDAGÓGICAS

RESUMEN: Las políticas y prácticas educativas de intervención en el contexto de pandemia y post pandemia comienzan a privilegiar el proceso educativo con enfoque en las plataformas digitales y la personalización del aprendizaje en redes. El objetivo del artículo es presentar el papel de los humanos y no humanos en las prácticas pedagógicas en la perspectiva de docentes y profesionales técnico-pedagógicos de la Red Estatal de Educación de Paraíba. Se utilizó el método de investigación cuantitativo y cualitativo con características exploratorias, descriptivas y analíticas. Los datos presentados fueron recolectados utilizando la herramienta Google Forms, a través de una encuesta multitemática. El universo de investigación abarcó 19.473 docentes y prestadores de servicios efectivos en el período del 9 al 21 de diciembre de 2021. Concluimos que además de los debates, teorías y métodos de la Educación a Distancia y de la Educación en Línea, es necesario reinventar los procesos de enseñanza-aprendizaje a través de plataformas (no humanas), alterando significativamente las formas de investigar, enseñar, producir y difundir el conocimiento. Las prácticas pedagógicas instituidas por las plataformas digitales son actividades con las que agentes humanos y no humanos trabajan juntos, enredados, interactuando y formando alianzas y vínculos, a partir de determinadas actividades instituidas y organizadas. Aunque subutilizado en su potencial educativo, el uso de las plataformas digitales trajo la percepción de que no es posible pensar en una educación que excluya internet y las tecnologías digitales.

INTRODUCTION

Through connected technical devices, we build ourselves and manage our presence in a globalized world (COUTO; COUTO; CRUZ, 2020). From this perspective, our concern is the perception that educational intervention policies and practices in the pandemic and post-pandemic context begin to privilege the educational process with a focus on digital platforms and the personalization of learning on networks.

These connective experiences, linked to mediations with different human and non-human actions, shape us and are shaped by our daily experiments (SANTOS, 2020; PORTO; OLIVEIRA; CHAGAS, 2019; LATOUR, 2012; LÉVY, 2009). Our central argument is that pedagogical practices emerge from entanglements between people and objects/things (SILVA, 2020) and in contemporary times they are also fed by digital platforms in which we associate, are associated, and, consequently, entangled. When thinking about the concept of pedagogical practices, we need to go beyond the relationships between teachers and students because viewing such practices only in humans predisposes us to exclude the materials that characterize everyday activities, giving the individuals all responsibility for actions and, consequently, not focusing on a larger scope of participants in pedagogical practices, renouncing the action of non-humans in the process.

Based on the arguments presented, the study is theoretically based on socio-materiality and the platformization of education. This article aims to present the protagonism of humans and non-humans in pedagogical practices from the perspectives of teachers and technical-pedagogical professionals from the State Education Network of Paraíba. We use quantitative and qualitative research methods, of an exploratory, descriptive, and analytical nature. The data presented was collected using Google Forms technology, through a multi-thematic questionnaire. This work is an excerpt from the research entitled "Continued Training in Basic Education: curricular practices as axes of professional development", which aims to contribute to the technical, pedagogical, and scientific development of basic education implemented by the public network in the state of Paraíba.

METHODOLOGICAL PATHWAYS

We used the method of quantitative and qualitative research of an exploratory, descriptive, and analytical nature (MINAYO; DESLANDES; GOMES, 2012). The empirical field of research was the Paraíba State Education Network, guided by public education policies and regulated by rules of the State's public authorities. According to the Court of Auditors of the State of Paraíba (TCE-PB-*Tribunal de Contas do Estado da Paraíba*) in November 2021, 19,473 permanent teachers and service providers were identified who correspond to our research universe (PAZ, 2021).

From December 9th to 21st, 2021, using Google Forms technology, we sent the questionnaire link[2] to participants' email. Google Forms is an application with several functionalities.

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[2] See: https://docs.google.com/forms/d/1pa7W7sfyPRwzXVZd3ebGNCcP5F1HhwTpw3KRAS5D5l4/edit.

Didactic and versatile, it offers several ways to analyze data. Content can be sent to respondents via email or link, organizing the data produced in the form of graphs and spreadsheets (ANDRES et al.; 2020; MOTA, 2020). Participants received the link consisting of a short explanation (in video) about the research and direct access to the questionnaire. The Informed Consent Form (ICF) was sent along with the link. Each participant had a free choice to access the link and respond to the questionnaire or not.

The results were organized into two themes: 1) internet access, connection, and quality; and 2) digital content and platforms used pedagogically. The data was analyzed using descriptive statistics provided by the Google Forms form platform. The completed questionnaires were saved in Excel tables, automatically generated by the platform. In these tables, all the data listed when filling out each questionnaire, the date and time they were answered, and what was written in each question separately were available, enabling the generation of graphs and percentages of each section of the questionnaire.

SOCIOMATERIALITY, PEDAGOGICAL PRACTICES AND PLATFORMIZATION IN EDUCATION

Cyberculture is the result of collective experiences mediated by networked digital technologies. Smartphones, computers, tablets, digital readers, and thousands of people connected to the internet structure cyberculture, and they give us the possibility of maintaining social interaction, even remotely, through technical devices. The growth of private initiatives and interfaces of large telecommunications corporations is notable, with access to virtual learning environments that model and enclose the educational process, often turning students and teachers into mere data to generate profit (COUTO; COUTO; CRUZ, 2020). However, much research related to the interaction between scientific knowledge, technological devices and society is still in its infancy, and criticizes the implicit social determinism incorporated in many studies, highlighting the lack of attention to socio-materiality (JARRAHI; NELSON, 2018).

Socio-materiality in research highlights how matter can be conceived as more than just a passive surface on which cultural meanings are recorded (GYGI, 2019). It is necessary to recognize that materiality acts as a constitutive element of the social world. Thus, while materiality may be a property of technology, socio-materiality represents the enactment of a particular set of activities that fuse materiality with institutions, norms, discourses, etc. (LEONARDI, 2012).

Unfortunately, the field of education considers, in many cases, only human agents in the teaching/learning processes and ignores non-human actors. In this way, we have a humanistic education, centered on the individual. This human protagonism is false. We know that humans do not exist or are constructed without non-humans, without the objects, things, and technologies that articulate our lives. Men and machines, organic and inorganic, increasingly mix in our ultra-connected societies and lives (FENWICK; EDWARDS, 2013).

The idea of the human presented in the article is not an exotic or different categorization, purifying humanity of the non-human elements that make its existence possible. However, a human being is not just an autonomous set of emotions, intentions, memories, and skills acquired in an isolated shell of skin. *A Cyborg Manifesto*, by Donna Haraway (2009, p. 92), already asked us: "Why should our bodies end in the skin?" We, as humans, are made up of several elements that shape us and associate us with the world (LE BRETON, 2003). In other words, the human is at the same time a singularity and a sum of

bonds with objects.

We live in networks that result from interactions between individuals and things. Therefore, we cannot separate the subject from materiality (LATOUR, 2012). This condition places us in the context of an education that highlights the multiple associations and the protagonism of the pair formed by the hybridity of humans and non-humans (SILVA, 2020). How is contemporary education leading to the protagonism of humans and non-humans? This is an essential issue to be discussed by researchers because studies based on socio-materiality allow us to trace, unveil and, subsequently, show how relationality is one of the main characteristics of each educational practice (DECUYPERE, 2019), showing the importance of non-humans in human dynamics and interactions and vice versa.

We emphasize the relationality between the actors involved in educational phenomena, as we understand that anything, human or non-human, can relate to anything else, human, or non-human, without assuming a priori differences between different actors (KIRCHHOFF, 2009). To illustrate this statement regarding relationality, we have the following claim: if (x), a non-human, and (y), a human, when associated, and related, constitute an action (z), then there are no differences between (x) and (y) in contributing to (z) happening, that is, the roles that humans and non-humans play are functionally equivalent, they are relational (LATOUR, 2012). Fenwick and Landri (2012) argue that socio-material approaches aim to examine how educational practices are composed relationally, by and through a range of human and non-human actors, and, even better, show the potential of conducting educational research without the need for exclusively place the usual educational suspects (student and teacher) center stage. They presuppose other understandings of pedagogical practices.

Pedagogical practices have become a relatively recent object of study when we think about the relational issue and, therefore, there are still many uncertainties about how the conceptual development of this category works and how it materializes (ROCÍO-ALMANZA, 2018). Work on pedagogical practices can be conducted from multiple ontological and epistemological perspectives, generating a variety of research paths. We enter one of these different approaches, heading towards the practice turn[3] and, specifically, motivated by the Theory of Social Practice (TSP), originating from philosophy, with influences on Theodore Schanktzi[4], post-structuralist (MOURA; DINIZ, 2016), to discuss pedagogical practices.

The choice to work with TSP aims to understand that the backbone of the practices assumes a relational dynamic that links individuals and objects/things (KNORR-CETINA, 2001). The field of practice is composed of material intertwining. They are arrangements of people and devices, things/objects, organisms, etc., through which they coexist. These entities are related and have identities and meanings (SCHANKTZI, 2001a; 2001b); however, they are conceived as actions internal to individuals (BARNES, 2001), and, therefore, make other entities invisible in the field of pedagogical practices.

Pedagogical practices are the daily activities that we develop in classrooms, laboratories, and computing environments, among other hybrid spaces, guided by a curriculum and whose purpose is the training of students (DÍAS QUERO, 2006). They have several components that need to be examined:

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[3] "Movement generated by studies of practices, and seeks, in essence, to overcome traditional dichotomies or polarizations" (ALVARENGA, 2017, p. 96).
[4] Professor of Philosophy at the University of Kentucky (Texas, EUA) and co-director of the Social Theory Committee at the same institution.

teachers and students, the curriculum, pedagogical projects, teaching materials, etc. In other words, pedagogical practices are not what teachers do in these hybrid environments in an isolated and/or specific way, but how they are associated with all other entities (ROCÍO-ALMANZA, 2018).

Thinking about pedagogical practices beyond the limits of human cognitive effects helps us to reposition the human and non-human associations of the world that surround us and in which we interact as teaching and learning take place, as we are embedded and entangled. This stance helps to give due importance to the subject and draws attention to the issue, contributing both to pluralizing and specifying educational practices and materially co-constitutive actions (TAYLOR, 2017).

Therefore, a paradigmatic review is necessary, expanding views on pedagogical practices and their interaction processes in networks, whose mixtures of elements interact to produce teaching, learning, research, etc. This understanding makes us to be open and understand where the action is taking place, guiding us toward the actors involved. It also allows us to recognize how the actions of these actors participate in creating the world in which we live. Thinking about socio-materiality in pedagogical practices pluralizes educational practices to consider bodies, objects/things, and spaces alongside and with humans. Thus, we understand that these socio-material relations are developed mainly through platformization.

The term platformization means the convergence of various systems, protocols, networks, etc., bringing together different actors and human and non-human actions, connected by a dynamic constellation of technologies, and economic and sociocultural mechanisms. They have penetrated deeply into the mechanics of everyday life, affecting people's informal interactions, as well as institutional structures and professional routines (POELL; NIEBORG; VAN DIJCK, 2020). Platformization is the interpenetration of digital infrastructures, and economic and governmental processes in different sectors of the spheres of life, favoring socio-technical systems and political-economic actors (companies, states) and how they build symbiotic relationships to create connective value and develop power of coordination (VAN DIJCK; POELL, 2018).

Far from being passive or inert, platformization is a living force that actively participates in events because it changes the conditions and rules of social interaction. Therefore, it deserves to be examined in detail to better understand its impact in various domains. It has an ecosystem with three main focuses: 1) technological infrastructure, focused on studies of interfaces and software enabling institutional relationships; 2) the data market, datafication, focused on promoting the collection of data from end users, tracking, and intensifying the participation of these users; and 3) governance, through contracts and policies, in the form of terms of service, license agreements and guidelines.

Platforms aimed at educational issues cannot and should not be seen separately from this ecosystem because they show profound changes in the organization of education. For Van Dijck, Poell, and De Wall (2018), online platforms not only affect basic learning and teaching processes but also impact the ways in which education is organized in a society that is increasingly data-driven and platform-based. These digital platforms not only have the power to govern social lives but also to function as government technologies, directing the flow of information and user practices (SILVA, 2020). These non-humans show how materials actively influence pedagogical practices, and how such educational practices are processes of socio-material achievements.

This system is not a level playing field, as some platforms are more powerful than others (VAN DIJCK; POELL, 2018). For Valente (2019), this is configured as digital monopolies, a

phenomenon in which digital platforms use their number of users, database, and technological power to expand their operations and influence the digital environment as a whole and other spheres of activity in society. In other words, these structures are new forms of surveillance and control of the interactions we develop as a network. The many traces we leave in connections are captured by algorithms that interpret human actions on platforms and interfere by modulating their needs and political, cultural, and educational consumption practices. In other words, these are non-neutral devices, composed of values and norms in their architecture. Therefore, it is important to look critically at these objects/things far beyond their use and observe the arrangements in which they were manufactured and shaped.

Most of these educationally used platforms are corporate, driven by algorithmic architectures and business models. They quickly gained millions of users and are changing learning processes and teaching practices, as they are made up of networks, and the "power" is in the associations that form when human and non-human actors interact (SELE, 2021), interfering with each other in overlapping ways.

According to Silva, Lima, and Couto (2020), the word network is often used as a synonym for the word internet, despite the transformations that have occurred over the years (computer networks, social networks, electrical networks, etc.). Therefore, it is important to keep in mind that network is a broader term that results in hybrid combinations, a cluster of human relationships with objects/things, but also involves discourses, imaginaries, events, etc., and the interaction of these complementary parts.

In this way, socio-materiality, pedagogical practices, and digital platforms mix and modulate our ways of producing education in cyberculture, creating teaching and learning processes in our multiple network interactions. Therefore, humans and non-humans play a leading role in pedagogical practices, teaching, and learning processes. This protagonism of humans and non-humans in education happens through our interactions on digital platforms. As they are not neutral, this context of platformization presents numerous challenges for education in cyberculture. Digital platforms operate within the phenomena of datafication, commodification, and surveillance capitalism. They act as companies that profit from connecting and monitoring individuals, including children, around the world to obtain commercialized data (ZUBOFF, 2021). This modus operandi indicates profound changes in the public and private areas, in public education systems, and their open and democratic character, in addition to transformations in autonomous teaching practice, which we cannot ignore.

Emphasizing the role of humans and non-humans in education means pointing out that teaching and learning processes start to take place because of the interactions mediated by network platforms. Such mechanisms have the potential to affect the entire pedagogy, as they develop integrated initiatives to manipulate data from managers, teachers, and students in schools, libraries, cloud storage, educational systems, etc., where our data circulates. Our main challenge is to free education from the imprisonment of a humanist vision without falling into the tyrannies of platformization at the service of companies and the market economy.

DATA ANALYSIS AND DISCUSSIONS

Socio-materiality recognizes that social, material, and affective relationships are inseparable and interconnected in everyday actions. It aims to challenge the idea that things – including objects, texts, technologies, human bodies, intentions, concepts, etc. – exist separately. We argue that people are effects

of relationships with objects/things and vice versa. In this sense, the internet, or rather, access to it, allows content to be projected, dialogues via chats, among other socio-material characteristics. Thus, our first question raised was about internet access.

The indicators show that 99.7% of participants declared that they had internet at home. These data corroborate data from the ICT Households survey (*TIC Domicílios)*, released in August 2021 by the Regional Center for Studies for the Development of the Information Society (Cetic- *Centro Regional de Estudos para o Desenvolvimento da Sociedade da Informação*) in partnership with the Brazilian Internet Steering Committee (CGI-*Comitê Gestor da Internet*), indicating that 81% of the Brazilian population has access to the internet (CENTRAL REGIONAL DE ESTUDOS PARA O DESENVOLVIMENTO DA SOCIETADE DA INFORMAÇÃO, 2021). It is known that access to the internet is important, however, it is also essential to understand what speed to access it.

We asked what types of internet connections the research target audience uses (it was possible to select more than one option). We identified that Wi-Fi – a globally known acronym that, in a simplified way, defines a nearby region with internet access – has the first place as the main type of connection for 89.4% of respondents. Mobile broadband, characterized by 3G and 4G, appears in 34.8% of responses. Both 3G and 4G are characterized as third and fourth generations, respectively, of cellular access technologies for data exchange.

With 3G, the first application stores and new branches of the digital economy emerged. With the 4G generation, the user had the possibility of being connected to several services in the "physical world" – food delivery, calling a transport vehicle, high-definition video sharing, and social networks are examples of applications that stood out in this generation (NATIONAL TELECOMMUNICATIONS AGENCY, 2022). We are experiencing technological transformations and almost everything is in digital format. Therefore, we asked what types of devices participants must access the network (Graph 1). In this question, it was possible to select more than one option.

Graph 1 – What type(s) of internet access device(s) do you have?
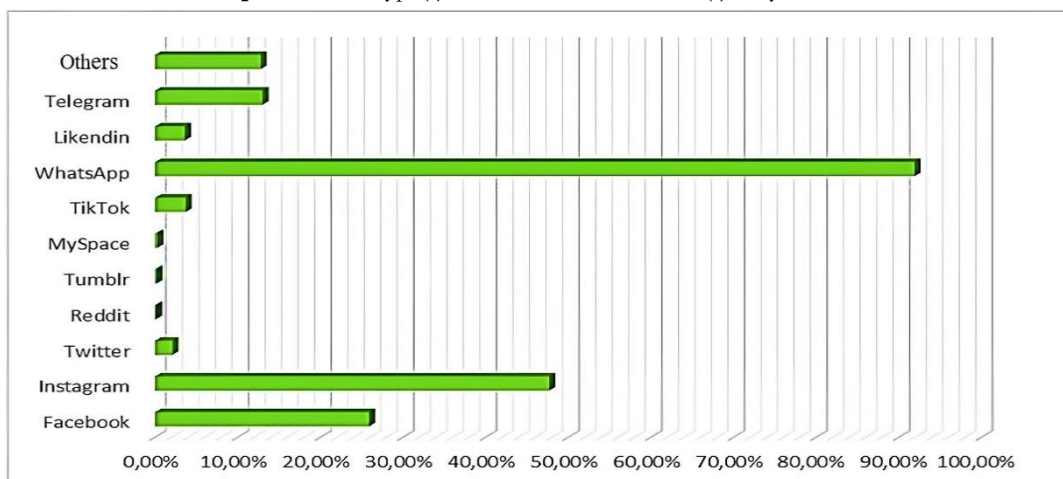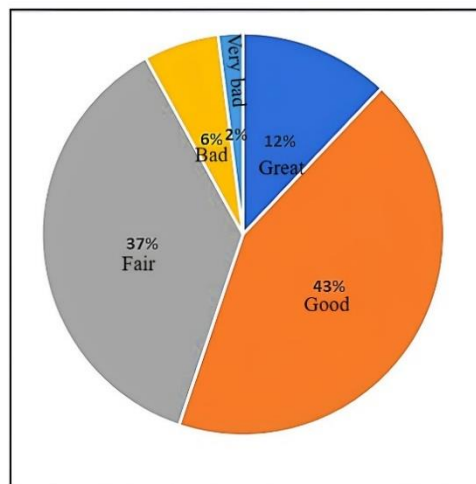

Source: research data, 2021.

The smartphone (77.7%) and the notebook (77.2%) were practically tied as the preferred devices for accessing the internet. According to Tokarnia (2020), cell phones are the favorite, followed by laptops. This information validates the Continuous National Household Sample Survey – Information and Communication Technology (PNAD Contínua TIC 2018-*Pesquisa Nacional por Amostra de Domicílios*

Contínua – Tecnologia da Informação e Comunicação), released in 2020 by the Brazilian Institute of Geography and Statistics (IBGE-*Instituto Brasileiro de Geografia e Estatística*).

While the smartphone occupies a prominent place, the computer (desktop) and the tablet reach a percentage below expectations, 17.7% and 7.1%, respectively. A very curious fact is that smart TVs appeared with 35.7% of preference among internet access devices. The popularization of these devices does not happen by chance, it is the concrete expression of the convergence between computer and TV. According to Sant`Ana (2020), smart televisions already accounted for 98% of devices sold in Brazil in 2020, according to data from the National Association of Manufacturers of Electronic Products (Eletros).

Our first observation based on the data presented so far corroborates the statement by Máximo Pimenta et al. (2021) that the contemporary world establishes new formats to visualize what is around us. That would be the contemporary seen on the screen. Another question was about the quality of the internet connection. Although the National Telecommunications Agency (Anatel-*Agência Nacional de Telecomunicações*) encourages the sharing of transmitting towers between different operators in the country, we still have connection quality problems, as seen in Graph 2.

Graph 2 – How do you evaluate the quality of your connection?

Source: research data, 2021.

According to the notebook "Broadband in Brazil: a study on the evolution of access and quality of Internet connections" ("*Banda larga no Brasil: um estudo sobre a evolução do acesso e da qualidade das conexões à Internet",)*, published by the CGI in Brazil in 2018, Content Delivery Network (CDN) service companies, for example, companies that work with internet content distribution networks were not good in terms of connection quality in Brazil, which falls short of expectations. In 2016, we were ranked 85th out of 241 countries surveyed, with 6.4 Mbps, below the global traffic average, which is 7 Mbps. We also asked participants what they do on the internet, that is, what content they access (Graph 3). For this question, it was possible to select more than one option.

Graph 3 – What content do you access most?
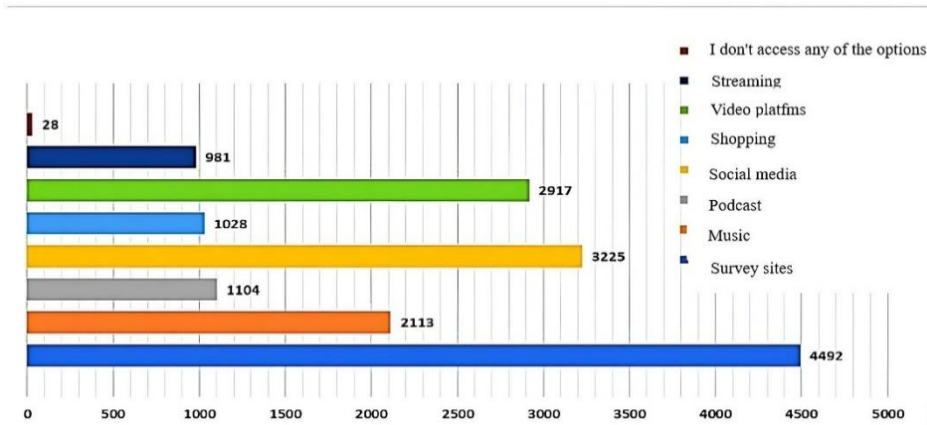
Source: research data, 2021.

We observed that the responses were spread around an average of 20% across podcast, e-commerce, and streaming content. A podcast is content created on demand, in an audio file, available for the user to listen to whenever they want. E-commerce means commercial transactions (purchases) carried out over the Internet and, finally, streaming is a service that transmits content over the Internet without the need for downloading. It is innovative to think of these three technologies as important (non-human) educational devices, as they bring advantages in the variety of formats and content available, in addition to the flexibility that users have when consuming them.

Observing Graph 3, 44.3% of respondents stated that they access musical content. According to Freitas (2022, no pagination), "[...] music is one of the main means of persuasion in society, as through it, it is possible to transmit not only words but also feelings, ideas, and ideals that can have great repercussions teaching if well directed". We have several educational research (RÊGO, 2013; SILVA, 2018; COSTA, 2016; FIGUEIREDO; MAGALHÃES, 2013) that bring the theme of music with different training possibilities. Thus, we need to think about how to insert music (non-human actor) into the teaching and technical-pedagogical training of the Paraíba State Education Network, not only as part of the education project to be developed but based on the action and mobilization of subjects involved in the practices (KANDLER, 2020).

The data collected by the question shows that most participants use research sites (94.2%) and digital social networks (67.6%). For Tess (2013), education likes to explore emerging technologies, such as new or improved devices, to improve instruction and learning. Search engines and digital social networks are transforming how students, teachers, and managers communicate, collaborate, and learn.

In the modern world, digital platforms have become a permanent direction in the development of educational relations. These non-humans, highlighted in Graph 3 – music, podcasts, shopping, streaming, social networks, etc. – incorporate the ethics of sharing and collaboration, in addition to optimizing the division of labor. According to Kharitonova and Sannikova (2021), these technologies are increasingly showing a trend of cross-integration, contributing to a variety of diverse applications, including educational activities.

Platforms, especially digital social networks, are important channels because they enable people and organizations to connect based on common interests. Through them, users are informed and share such information. But this is only one side of the issue. We cannot ignore that through them, we

leave more and more traces that are followed, observed, and classified about our habits and behaviors. Through them, we are constantly monitored by other people, but above all by companies and governments. Platforms are not neutral, but rather modes of surveillance and control in connected societies, in the new global regime of algorithmic information mediation (BEZERRA, 2017).

We asked which digital social media platforms the respondents had (Graph 4) and which of them were used for pedagogical purposes (Graph 5), and in both questions, it was possible to select more than one alternative.

**Graph 4** – What digital social networks do you have?
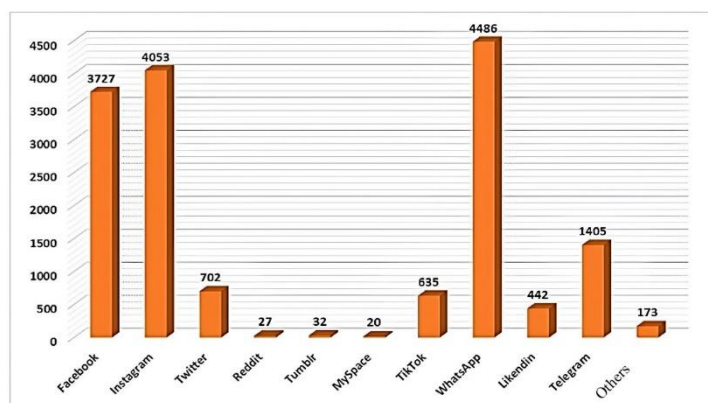
Source: research data, 2021.

WhatsApp, with 94.1%, is the digital social media platform most used by respondents. Installing the instant messaging application on smartphones is a consensus since mobile phone operators allow unlimited use of it, without charging the users' data package. Instagram appears in second place, with 85%. This platform, initially designed for sharing photos, today has numerous functions – videos, texts, stories, polls, lives[5] , and the use of memes and GIFs[6] - which can and should be used by students, teachers, and schools as part of pedagogical practices. Facebook was born in 2004 at Harvard University – located in the city of Cambridge, Massachusetts, in the United States – as a digital social networking platform restricted to university students. In our survey data, 78.2% of respondents say they have an account on this platform. According to Salgado (2021), the platform is the most used worldwide, with more than 2.7 billion active accounts, and, in Brazil, it is the third most accessed digital social network. In addition to the previous question, we asked which platforms were used for pedagogical purposes (Graph 5).

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[5] Live streaming of audio and video on the internet.

[6] It means Graphics Interchange Format that enables the compression of multiple scenes, displaying motion.

Graph 5 – What digital social networks are used for educational purposes?
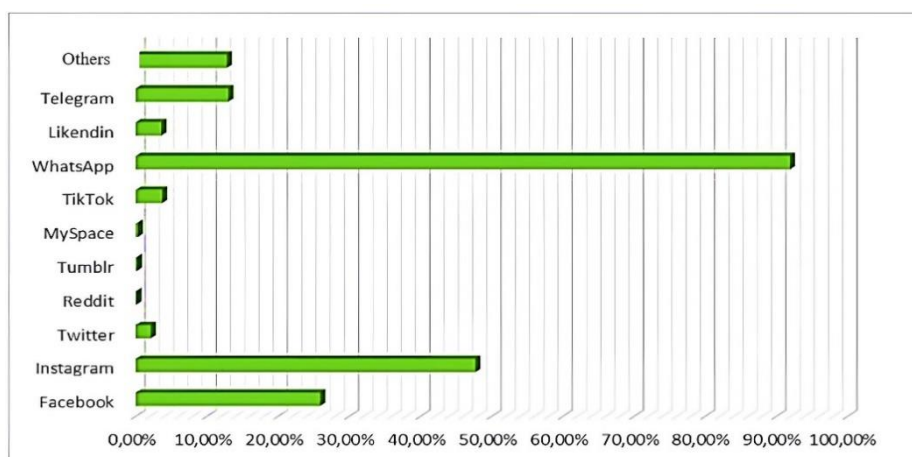
Source: research data, 2021.

WhatsApp appears as a social network used for educational purposes by 91.9% of participants. According to studies carried out by Couto and Souza (2017) and Silva and Feitoza (2021), WhatsApp can be incorporated into the classroom, as it allows the construction of a teaching process closer to the reality experienced by young people, as they feel comfortable for other appropriations, such as sending links, debates about the content passed on by the teacher and construction of contemporary languages, such as the use of memes[7].

Among respondents, 47.7% say they use Instagram pedagogically. With creativity, the resources available on this platform – photos, videos, polls, etc. – can help the teaching and learning processes to send notifications, publicize student work, review class content, or even make reading recommendations and document the school year, since a large proportion of basic education students are present in this virtual environment.

Regarding digital platforms for pedagogical purposes, we identified that 25.9% of respondents use Facebook. According to Costa Diaz and Ignácio (2015), information and knowledge are dynamic, and, to establish and stimulate a learning environment, it is essential to develop a pedagogical project that is in line with educational trends. Santaella (2013) states that the creation of environments where interaction is constant, such as Facebook, implements a culture of participation in which everyone collaborates, as everyone believes that their posts matter and develops a certain degree of social connection. The field of education began to appropriate these technological platforms to obtain yet another pedagogical resource, highlighting that the presence of the teacher, holder of knowledge and information, changes to the mediator of learning constructed and shared by all subjects (human and non-humans).

FINAL CONSIDERATIONS

Even though their educational potential is underutilized, the use of digital platforms has brought the perception that it is not possible to think of an education that excludes the internet and

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[7] Memes are viral images from the internet, which use various types of texts (verbal and non-verbal) to express an opinion on a given topic. With a humorous, critical, social or reflective tone, memes have a collaborative characteristic (BLACKMORE, 2000).

digital technologies. In this context, our study points to a set of conclusions. The first conclusion is that, in addition to the debates, theories, and methods of Distance Education and Online Education, it is necessary to reinvent teaching-learning processes through (non-human) platforms, radically changing the ways of researching, teaching, producing, and disseminating knowledge. The second conclusion is that pedagogical practices, in a socio-materialist view, are activities in which human and non-human agents act together, entangled, interacting, and forming alliances and bonds, based on certain instituted and organized activities.

The third conclusion is that, despite certain efforts from governments, institutions, and, mainly, teachers and students, many pedagogical activities are based on a traditional education model that highlights the protagonism of the individual. However, it has become impossible to teach and learn without considering the multiplicity of objects that act on us and on our experiences of providing education through connections. These are computers, laptops, tablets, digital readers, smartphones, apps, websites, etc., that, mixed and coupled with humans, build our lives. We learn that, without non-humans, humans do not exist and are no longer able to act in the world.

The fourth conclusion is that the recognition of the materiality that operates in the teaching and learning processes highlights socio-materiality, resulting from human and non-human interactions and actions. This condition indicates that the humanist perspective is no longer sustainable and highlights the protagonism of the human-non-human pair in education in the era of connectivity in cybercultural times.

The fifth and final conclusion is that platformization helped to develop important values in education such as the collective production of content, the sharing of knowledge, and the various associations between humans and non-humans. At the same time, it also brought immense challenges related to the surveillance, control, and commercialization of our personal and institutional data, such as school data. It is always necessary to problematize how, for what, and for whom our human-non-human interactions produce results.

Our study points out that the uses of digital platforms in pedagogical practices, highlighting human and non-human roles through socio-materiality, create and enable new ways of educating. However, it also indicates that these ways of educating are increasingly integrated with algorithmic actions from platforms that guide, condition, control and monitor our educational actions and performances. This is an issue to be explored further in other studies.

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Author 1 - Project administration; investigation; writing the original draft; methodology; curation and active participation in data analysis; writing, reviewing, and editing the final text.

Author 2 - Supervision; writing, reviewing, and editing the final text.

DECLARATION OF CONFLICT OF INTEREST

The authors declare that there is no conflict of interest with this article.