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Researching the network, on the network and with the network: articulations and perspectives of Netnography[1]

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Abstract: The world has changed, maps have been redrawn on the boundaries of interactive relationships, ancient ethnic groups have resurfaced, and new cultures have appeared in the digital landscape. A quick glance at the Internet shows how human culture, already complex, has become even more diverse. This article proposes a tour of the changes that have occurred in the last decade in the social interrelations with the massive use of the Internet. In this scenario, new configurations of human groups have been made possible by these interactions, especially mediated by artificial intelligence (AI). These changes have a direct impact on the way ethnography is done, since the ethnographic subject, its culture and interactive forms are the main target of this type of investigation. Online communities, remote education, hybridity in teaching and learning, are some of the discussions that are intended to be outlined. The text is developed from bibliographic research that has as its object the concept of netnography, its application and implications for pedagogy in the digital age. The results of this review demonstrate that the terms: netnography, virtual ethnography, webnography, digital ethnography, social media ethnography, or online ethnography are some examples of this variety of approaches. It is also intended to demonstrate how the use of digital ethnography expands to various fields of knowledge. The main problem is the ethical issue that permeates human relations and ethnographic practice. In this regard, it is important to carefully consider security concerns regarding individual and social privacy, as well as to prevent disinformation in the digital realm.
Keywords: ethnography digital; netenography; digital security; ethical.

1 Introduction

The late 20th and early 21st centuries witnessed the establishment of a new conception of society. Causing a strong impact on the new TDIC-Digital Information and Commu-

[1] This article was translated into English by Carmen Lúcia Guimarães de Mattos.

nication Technologies, considered TDR-digital technologies in networks. They enable any computer, smartphone, smartwatch, or tablet, as well as other mobile devices, to connect to the network to access documents and hypertext functions that integrate content in databases around the world, providing individuals who manage this information with various non-linear paths of access and production of knowledge (Mallagi, 2009). According to Claro (2009), the digital age has significant importance for the development of a new society as it is responsible for producing profound changes in different social sectors, representing more than just a modernization of tools or devices; it represents a transformation in the possibilities of communicating, interacting, producing knowledge, having experiences, and living a life in a different way (Vilaça, 2014).

A more global and hegemonic culture is spreading across the physical borders of countries and regions, bringing groups closer together and forming new communities, thanks to the unprecedented acceleration of the globalization process associated with the advancement of networked technologies. (Giddens, 2000; Dugnani, 2018). It is this movement that Levi (1996) calls a process of virtualization with the establishment of this virtual space and parallel to the physical world, in addition to being responsible for transforming access to information and breaking the temporal and geographical barriers that are so far not very present.

A connected and networked world quickly begins to establish itself with the advent and dissemination of the Internet, creating a new technological paradigm with very particular characteristics, namely “information as raw material,” “penetrability of the effects of new technologies,” “network logic,” “flexibility,” and “convergence of specific technologies for a highly integrated system” (Castells, 2003).

Networked technologies are becoming, then, more and more imminent and indispensable in the life of the human being as a whole, and it is possible to perceive their impact in the context of the relationship between people, in work, in leisure, and in the areas of knowledge production and the supply of services, such as health, education, science, etc., bringing great behavioral and social changes (Fischer, 2007).

Fuchs *et al*. (2010) say that the impact of the Digital Revolution on science and the way knowledge is produced and disseminated is very significant in this new context. It discusses the central role that knowledge has in this process of transformation by going through some phases where, first, greater access and sharing of information and studies were made possible, which before the TDRs was more difficult and restricted. After this phase has been established, there is the moment when the human being becomes active in the way of building content opportune by the online world. And finally, the phase we are living in today, where it is possible to see computers and machines with capabilities close to those of the human brain, the so-called and promising AI.

It is worth highlighting the transformations experienced in the field of scientific research, which is also being developed from a new perspective embedded in this context. The modernization of research techniques, the emergence of digital research methods, and the use of new tools that enhance data production processes or optimize analyses are icons that reveal the influence of TDRs in the investigative process, as well as new concepts about research that are being built in this digital age.

To recognize the importance of the role of digital technologies and media is to acknowledge the changes that they are driving the society of this new millennium as a whole, and here we want to draw attention to ethnographic research in particular.

In the twenty-first century, ethnography faces new challenges and modulations. Digital networking permeates everyday life, interactions, ways of doing things, and living cultures. Faced with the understanding that culture is a network of meanings, and that ethnography is a means to understand it (Geertz, 1989), there is an unfolding that shifts from the classical models of ethnological research, opening the range of possibilities connected to the current historical and social time. In this sense, netnography establishes itself as an investigative practice that dialogues with the relationship between culture and digital technologies in networking, raising relevant themes such as media and digital literacy (Correia, 2011), the interfaces of artificial intelligence with everyday life, and the construction of senses, among others.

Understanding ethnography in its theoretical-epistemological and methodological fields points us to the fact that the intentional look at the world articulated from the perspective of the other is based on a process of reflectivity (Mattos, 2001, 2022; Alves; Rangel, 2019) and of ethnographic attitude (Fagundes, 2024). In this sense, ethnography engages in a visceral dialogue with the cultural reality it inhabits. Looking at contemporaneity and its interface with networked digital technologies and mediation processes (Hjarvard, 2014, 2015), research immersion creates a lively dialogue with the dynamics inherent in these new contexts. Research looks at these dimensions but also builds on this perspective, making a wrapping of meanings and actions.

This article will lead us to establish the relationship between ethnographic research and its paths in dialogue with digital technologies in networks, emphasizing netnography as a path and possibility of research in contemporary times. It is based on the results of the research “Ethnography and Exclusion: Meta-interpretative analysis of research conducted by the Nucleus of Ethnography in Education (1984 –2016)”, developed by the NetEDu, coordinated by Prof. Dr. Carmen Lúcia Guimarães de Mattos, when we conducted an extensive bibliographic survey using the methodology of systematic bibliographic review, known as RBS-Roadmap (Conforto; Amaral; Silva, 2011), associated with content analysis with the Atlas.ti24 Platform. During the study, which covered the period from 2000 to 2023, we iden-

tified scientific articles and other publications with open access that dealt with the topics of digital ethnography, virtual ethnography, cyberethnography, networked ethnology, internet ethnography, artificial intelligence as a method, and visual ethnography. We selected 139 publications that mentioned the term netnography, which offered us a broad overview of this field of study (Mattos, 2023). Here we return to the contributions of the previous research, examining three key aspects of netnography: its conceptual developments, its methodological procedures, and the prospects of transformation with the consolidation and dissemination of artificial intelligence.

2 Netnography: conceptual developments

Professor Robert Kozinets, an expert in social media and marketing research, invented netnography during his Ph.D. to understand why people were fans of Star Wars and Star Trek. The term netnography comes from the link between the net suffix [net] and the word nethnography, associating ethnographic research with context, space, and cyber phenomena. Scholars discuss netnography as a way to articulate ethnology with computational resources, however, this concept extends to the understanding of netnography as an investigative method with various possibilities of deployment: research of virtual communities; participation and observation of meetings and meetings online or by web conferences, which take place systematically by a particular group; follow-up of sites and posts articulated to direct interfaces (even by digital means) with users, mediators or creators; complement or expansion of the field ethnographic method, modifying it, when the research subjects spread their actions to digital environments, among others (Amaral; Natal; Viana, 2008).

The approaches of scholars to ethnographic research and its relationship with the dynamics of the contemporary context relating to the digital and the network point to similar definitions with different nomenclatures. Following the same logic, epistemology, and methodology, they add the dimension of ethnography to the dynamics of digital technologies in line with the following terms: netnography (Amaral, 2008; Kozinets, 2014), virtual ethnography (Hine, 2000), digital ethnology (Mattos, 2012), and social media ethnography (Postill; Pink, 2012). For this work, as proposed in the title, we will articulate the contributions of these authors adopting the term netnography, because it is understood to be the most widely used in the current time, as well as more comprehensive, for placing ethnography from the perspective of the study of networks and the Internet.

According to Kozinets (2015), the main feature of netnography is multiplicity, which refers to the ability to analyze and interpret various online data sources, such as

posts on social networks, forums, blogs, and other virtual spaces. The author characterizes netnography as a methodology that investigates online social interactions. He states that “netnography” was developed in the area of research on marketing and consumption incorporating views from various fields, such as anthropology, sociology, and cultural studies” (Kozinets, 2014, p. 10, author’s grip). This origin is due to the focus on investigating and analyzing the behaviors and abilities of consumers and Internet users for brand promotion through advertising strategies. Today, for example, the field of communication extensively employs netnography in its reception studies. By expanding their initial scope to include marketing and advertising, reception studies aim to understand how recipients actively construct meaning from the messages they receive. Reception studies recognize that individuals are influenced by their own cultural, ideological, social, and historical contexts, rather than being passive to the media and culture (Brito, 2023). Netnography, in this context, seeks to analyze human behavior in the virtual field against broader aspects and communication processes, spreading into the social field and politics, among others.

Kozinets (2014) points out that netnography focuses on the study of online social experiences and emphasizes that they have a differentiated nature from face-to-face interaction, which directly influences the way we research this phenomenon. In the context of the Internet, the mode of access to data is differentiated; the implication of the subjects who make up a virtual community or carry out interactions and manifest their reactions gains other contours. This type of interaction is characterized by both the methods and codes employed, indicating a significant difference that necessitates the development of a specific methodology to study the subjects within the network. As a result, the forms and methods of analysis can also differ significantly from ethnography, given that nethnography is a field with its own unique structural and relational constructs. The process of setting up the field involves defining community and culture in an online context. In the first instance, it is essential to look at collectivity. Studies develop looking for connections that are established between subjects, not with a focus on individuality but in the community. Communicative processes are part of the research amalgam since they consist of the exchange and construction of symbols based on symbolic systems that mean online culture and modes of interaction. Another important aspect is the composition of online communities, which, in order to be understood as such, must have a base group of participants that constitute them as a cultural corpus. The author asserts that the presence of at least 20 individuals is crucial for the formation of a virtual community.

In terms of data accessibility, netnography turns to online communities, in particular, that conduct public and open discussions. It is important that there be continuity of interactions within the group for a good period of time for it to constitute itself as a

community. Similarly, netnography, in order to constitute itself as such, needs to be connected to interactions continuously and also needs to accompany the group for a continuous period to grasp the cultural dynamics and meanings. In the sense of the definition of online community, relationships between subjects are getting narrower, opening up space for manifestations of feelings and the sharing of emotions, building relationships of trust, and expanding interaction to other contexts beyond the community. Regarding online culture, it is understood that there are codes and processes that configure and configure in a specificity of this space.

However, Kozinets (2014), even presenting the concept of cyberculture (Lévy, 1999) as a reference for understanding the internet and the cultural dynamics that permeate networks, argues that online culture is reflected in the peculiarities of virtual communities, being more delimited to the forms of expression and meaning that each group builds as a cybercultural singularity. Kozinets (2014) also states that online communities extrapolate interactions on the Internet, forming or linking to political and social mobilization groups, spreading their reach into the context of citizenship.

According to Hine (2000), the Internet is both a cultural artifact and a field of culture in and of itself. In this sense, netnography serves as a tool for comprehending not only the Internet itself, but also the phenomena it mediates and the ways in which its use shapes them. Understanding the Internet as a medium that constitutes itself as a sense in itself, but that also produces senses by the very ways of use that constitute it—the ways of interaction it causes, the uses of own codes, images, videos, and memes. Martín-Barbero (1997; 2018) argues that the media is a constructor of meaning both by the way it handles information and establishes social standards, as well as by the responses of its agents, who always constitute themselves as producers of significance. In this way, the Internet becomes a favorable and affected field for the nature of ethnographic research since it constitutes a cultural field, weaving a network of meanings that can be observed, described, analyzed, and interpreted in a living dialogue with the reality itself studied.

Mattos (2012, 2013) contributes to the construction of the concept of netnography when he defines digital ethnography as an articulation between the approach of ethnographic research and the study of sociocultural production spaces mediated by digital technologies. The author defends this methodology as an innovation that carries out an investigative interface with inter-relationships between social subjects involving technologies, media, and digital contexts. This conceptualization brings the differential of ethnography that reconfigures itself before the new demands and social profiles, unrooting itself from the physical space to immerse itself in the virtual and confluence the physical and the virtual. She argues that what changed in the context of ethnography

were the environment and the tools of access, but that the classical model of ethnology and its principles remained the same. Thus, netnography is a post-modern ethnology with current apparatus, but it has not lost its essence (Mattos, 2012, 2013, 2014).

Postill and Pink (2012) call and define what we mean in this article as netnography, or social media ethnography. The authors argue that research in the cyber context creates ethnographic places (Pink, 2009) that are situated in the study of online and offline contexts that are based on principles of collaboration, participation, open access, and public. In this sense, the authors dialogue with the perspective of cyberculture, proposed by Lévy (1999), which defends the internet as a space of collective construction. The author involves his theoretical-epistemological effort in enthusiastically delineating the Internet as a place of production of culture that transcends virtuality, creating mechanisms and productions of meanings that create new types of interaction between the subjects and the subject with knowledge. These new ways combine in other social forms, deeply connected to the new logic of knowledge production and modus vivendi. Postill and Pink (2012), in dialogue with this perspective and the Kozinets perspective (2010), define that social media research goes through the perspectives of community, culture, and networking. They say that a plural concept of sociability is necessary for this. They emphasize the routine aspect of the work of the ethnographer, structured on the mobility of the vividness of the experience, which sometimes becomes fugitive and therefore open to revision. Thus, the researcher's reflexive questioning must be constantly active in order to understand the phenomena that are constantly moving in the context of the Internet.

In the social interface, we can understand that the Internet is a space usually shaped by the social context, with socio-economic and cultural phenomena that influence it and, sometimes, determine its parameters of use in interaction. The current discussions on how to handle the algorithms carried out by AI-artificial intelligence are a critical point of this issue. In the broader context of its insertion and social role, organizational choices in media management traverse the cyber environment, influencing perceptions of its service, cultural significance, intentionality, and modes of use. In this amalgam, it presents itself as a configurative field that, for understanding its dimensions, needs an investigative look that dialogues with its own means and uses under its qualitative and phenomenological aspect—the perspective from which netnography identifies itself. Research under these parameters supports a holistic view of networks, media, and digital technologies. It assumes that these means offer a significant field of ethnographic analysis, both in terms of their production and their use. Understands the Internet as a form of social interaction either that involves the co-presence of the parties involved in the sharing of information or opinions or in the form of text, which constitutes

a kind of interaction temporarily displaced and packaged (Hine, 2000). In this sense, the text brings a specificity to netnography, since

> while spoken interaction is ephemeral (unless transcribed by social scientists) and local, texts are mobile and therefore available outside the immediate circumstances in which they are produced. The texts have the potential to be available outside of their place of production, making it possible to separate production from consumption. (Hine, 2000, p. 50)

Thus, the process of research on the Internet involves reading and writing texts, and the effort of the ethnographer is directed toward understanding the meanings involved in these textual constructions as well as the way in which individuals experience them either as their producers or their users.

In dialogue with the process of netnographic research, according to Hine (2000), the construction of the object of study in netnography is also given as a question to be problematized. The author asserts in her contributions that the primary focus of the object should be on flow and connectivity, i.e., modeling the Internet's unique fluidity in interactions. Because of these characteristics, it becomes elementary to create boundaries for the research, which are constructed along the path of the research, so that the object can even be reformulated from the decision of a new delimitation drawn by the connectivity profile of the studied reality. In this sense, this dynamic becomes adherent to the progressive hypotheses already outlined by Hammserley and Atkinson (1983), but drawn in dialogue with another place, not just that physically situated as seen in traditional ethnography.

Netnography, as an object that we could call here universal, turns its gaze to relationships of interaction mediated online (Thompson, 2018) and offline, since it is located on the Internet and characterized as cultural text. Netnography, in this context, is alive and adaptive, putting itself in a constant process of questioning, which makes it contextual, sensitive, and relevant as the study of situations in relation.

In the process of doing netnography, it is important that the ethnographer actively engages with the participants in the survey, or the surveyed community, rather than being "an impartial and invisible analyst," which "allows a deeper sense of understanding of meaning creation" (Hine 2000, p. 25; our translation). Within the field of research, it is possible and feasible for the ethnographer to remain invisible as a passive observer, especially as regards the assumption in traditional ethnography that the observer is the one who must remain "neutral" in the field. Currently, understanding, by the constructionist phenomenological line and understanding, that the research is not neutral and that the researcher acts, interferes and interacts with the field from its entry into it (Becker, 2008), Hine goes further, proposing that the investigator interacts in the field and with the participants, with the intention of creating a

process of reflectivity (Alves, 2003), to what can be called an interactionist approach, which allows the researchers an understanding of the phenomena from itself, in the sharing of the look with the other and not on the other – that is, the interfaces that the internet provides, if they start from an experience of the ethnographer through its immersion and interaction with richer interpretative clues, confronting the researcher with real problems, in a more concrete way and close to the experience experienced by the research participants.

3 Building netnography: methodological features

Netnography has evolved significantly over the last few decades, employing a variety of sources of information and methodological procedures. This evolution has enabled the collection of rich and diverse data, which enriches but also complicates research. According to Kozinets (2010), data collection in netnography includes the extraction of posts, comments, messages, and other forms of digital communication that occur on online platforms. Furthermore, we can supplement the observational data with online interviews and questionnaires. This process requires specific tools and techniques to capture and organize large volumes of digital data effectively. Morales, Santos, and Gonçalves (2020) emphasize that netnography differs from other research methodologies by the possibility of using archived data (including observations, audiovisual records, graphics, and photographs), but also information produced in real time on online platforms, such as social networks (Facebook, LinkedIn, Twitter, Instagram), microblogs, blogs, and messaging apps (WhatsApp). This diversity of sources (sync and asynchronous) allows the researcher to obtain a broad view of the interactions and behaviors of the participants, widening the scope and possibilities of analysis.

As for the collection of digital data, Kozinets (2020) emphasizes that in netnography it is possible to employ a variety of forms of information and digital communication, such as posts, comments, messages, images, videos, and other multimedia content shared online. It can include passive observation, participant observation, online interviews, and questionnaires, among other less conventional instruments such as lives and performances. Various platforms, software, and applications can be employed to capture and organize large volumes of data. For example, qualitative data analysis software such as NVivo and Atlas.ti helps researchers encode and categorize data, facilitating the identification of patterns and emerging themes.

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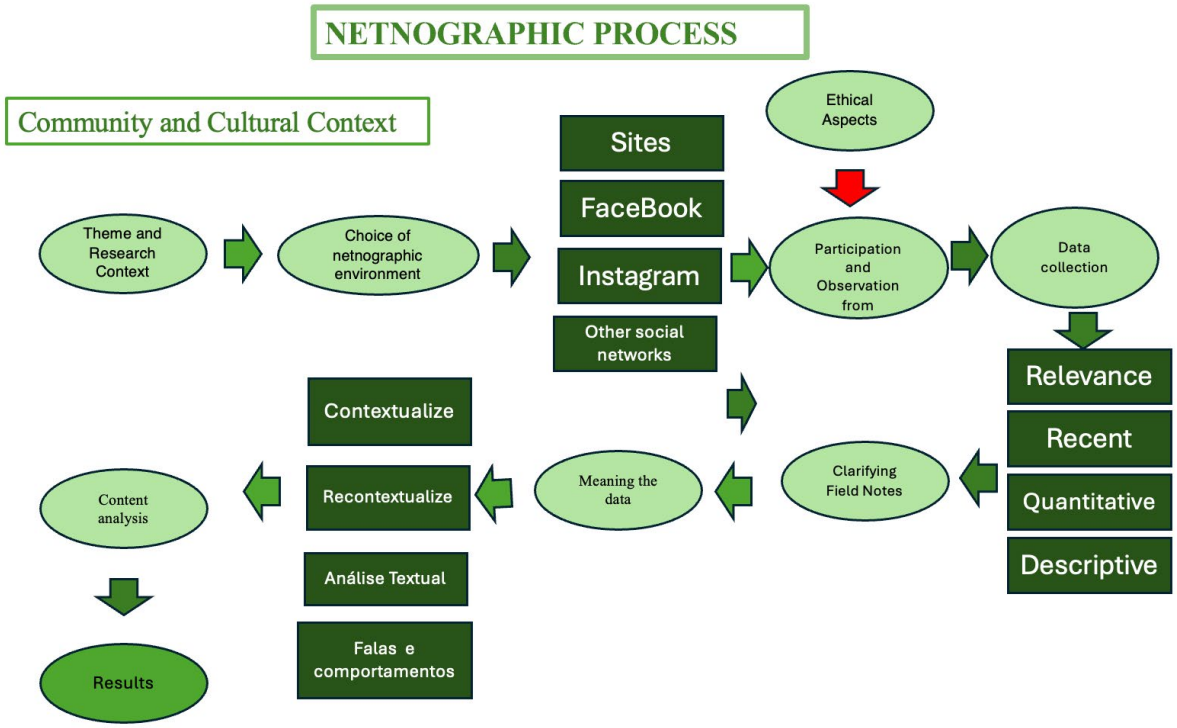
Morales, Santos, and Gonçalves (2020, p. 446) propose a series of steps for the development of research entitled Netnographic Process (Figure 1). Starting from the cultural context of a particular community, which may be real or virtual, the netnographer starts its trajectory by choosing the topic and the context of research, then chooses the loci, or netnographic environment, that has as an example the social networks: sites; Facebook; Instagram, among others. The researcher observes and participates in these loci, respecting the ethical aspects of conducting research with human subjects, with the aim of collecting data. From there, it separates the relevant data, observes the timeliness of their data, and determines the type of instrument to be used, whether quantitative or qualitative-descriptive. After the collection, the netnographer organizes his notes and the body of data so that it is clear whether they meet the objectives of the research. It does this by contextualizing, recontextualizing, and doing textual analysis, which can be done with a computer tool. It transcribes and means the speeches and describes the behaviors of the participants and goes to the analysis of the contents of these talks and events that show behavior that can be visualized, in loco, or through videos, photos, and, even, stories told by the participants or associates. For content analysis, you can use computer programs such as Atlas.ti24 or proceed manually. This is the crucial stage of the process, as it culminates in the written description of the results found.

Figure 1 – Nethnographic Process



Source: Adapted from Morais; Saints; Gonçalves (2020, p. 446).

The Association of Internet Researchers published the paper Ethical Decision Making in Internet Research in 2012, making a significant contribution to the field of ethical research on the Internet.

We present two examples of netnography that exemplify the characteristics previously listed. The article entitled “Netnography of the Curriculum Reform of Brazilian Secondary Education,” conducted by Nazário, Santos e Ferreira Neto (2020) and published in the Brazilian Journal of Education in 2021, analyzes the discursive practices of curriculum reform in secondary schools in Brazil, specifically in relation to the curriculum component of physical education. Using netnography as a methodology, the researchers collected data from interactions on social networks such as YouTube, Instagram, Facebook, and Twitter. The main objective was to understand the perceptions and discussions around the proposed changes and their impact on school physical education. The results indicated that there is a diversity of opinions and heated debates about curricular reform, with significant implications for physical education. Online interactions revealed concerns about the implementation of the changes, the suitability of the new curriculum to students’ needs, and the impact on teacher training. This study is relevant to netnographic research because it demonstrates how the analysis of interactions on social networks can provide valuable insights into educational policies and their repercussions on school practice.

The second article, “Netnography as a possibility of research in education and technologies: evaluation, interaction, and technological resources,” by Oliveira (2021), investigated how netnography can be applied in education research, especially in the context of educational technologies. The aim was to explore user interactions and evaluations on distance learning platforms, focusing on the Open University of Brazil (UAB), the only public university in Brazil dedicated exclusively to distance education. The results revealed that netnography is an effective tool for students to understand interaction dynamics and evaluate technological resources. Analyses have indicated that interaction between students and teachers, as well as the usability of platforms, are critical factors for the success of distance education programs.

Therefore, according to Costello, McDermott and Wallace (2017, p. 9, our translation), “netnography is an easily adaptable methodology, offering a specific set of analytical steps and approaches, applicable in a wide spectrum of involvement, from passive observation to active participation in online conversations and activities”. The authors argue that netnography adopts plural characteristics, which are adapting to the complex configuration of cultures in digital environments, demanding new looks and approaches, as has happened with artificial intelligence.

4 Netnography: perspectives and implications of AI for ethnographic research

It is impossible to discuss netnography without considering the advances brought about by the use of AI in research, as this technology’s very mechanism encourages the formulation of questions that algorithms will process and provide intelligent answers to. This implies that the AI user is a permanent researcher. Therefore, he must acquire the skill of questioning to obtain relevant answers to the questions he has posed. In this context, it is important to understand the implications of the use of AI in everyday life and in scientific research.

People have celebrated the exponential advance of AI, particularly in fields such as music, commerce, industry, economics, and medicine. But it has rarely been part of investments in research in the field of humanities, such as education, social service, law, communication, and human development, among others. There exists a disparity between the dissemination of knowledge and its actual application. In fact, the functions of AI have long taken over various sectors of human life, without people knowing where they come from or what affects them. Not uncommon, we see people say that when talking about a subject inside your home, minutes later, ads appear in their app networks on smartphones, offering the mentioned product. This is a small example of how AI is present in the day-to-day lives

of people who attribute “casualty” or a “supernatural message” to recurring facts, which for scholars means the presence of AI in people’s lives.

In this context, ethnographic research is important because it has as its main feature to understand people’s daily lives, to study how they perceive themselves, how they learn, and how they use knowledge in their lives, in communities, in societies, and in their cultural universe.

The transformations brought by this new version of an AI-mediated society, which has the characteristics of communicating, interacting, and working knowledge from a perspective mediated by artificially produced numbers, have been expanded with functionalities added to this technology. They produce a new form of interaction guided by the direct connection between people and “smart” machines, and even machines with themselves.

Fuchs *et al*. (2010) explain what we know as Web 3.0, that is, networked digital technology that supports human cooperation, whose main feature is the ability to develop activities that are exclusive to the human brain, such as thinking, planning, executing, and acting with complex interfaces for finding solutions. The advent of Web 3.0 is characterized by specific features for support and collaboration that can get people closer together (Giraffa; Kohls-Santos, 2023).

However, in order to uncover the evolution of the Internet, one has to understand the different stages of this evolution until we reach Web 5.0.

In the early 2000s, Web 2.0 emerged, characterized by user-generated content and social media platforms. It marked a shift from static web pages to dynamic, interactive pages, often associated with the onset of “social networks.” Social media sites like Facebook, Twitter, and LinkedIn have made it possible for users to connect with others and share information in real time. Web 2.0 also saw the emergence of blogs, wikis, and other collaborative platforms that allowed users to contribute to and edit online content.

While Web 3.0, known as the semantic web, is characterized by the use of artificial intelligence and machine learning algorithms to make sense of the vast amount of data available online, The goal of Web 3.0 was to create a more intuitive and personalized internet experience by understanding user preferences and providing personalized content. It allowed devices to communicate with each other, creating a more connected and integrated world.

More ahead, we have Web 4.0, which is known as the future of the Internet, and it is still being developed. It is expected to be a fully decentralized web where users have more control over their data and privacy. It will rely on blockchain technology to create a secure and transparent online environment where users can interact with each other and carry out transactions without the need for intermediaries. This Internet will be more autonomous, intelligent, and decentralized, with the aim of creating a more equitable and fairer online ecosystem.

As we move towards a more decentralized and intelligent web, future possibilities are unlimited. Simultaneously with Web 4.0, which is among us but not available to all, Web 5.0. is the fifth generation of the WWW (World Wide Web). It promises to provide users with interconnection and innovation, and it is characterized by a more advanced level of artificial intelligence, with an emphasis on customization and the ability of machines to interact with each other. Web 5.0 has the potential for machines to understand and interpret Internet content. This means that search engines will be able to provide more relevant results and that chatbots and virtual assistants will be capable of understanding and responding to our queries more accurately. Each user's individual needs and preferences will specifically shape the level of customization of the sites and services. Imagine a world where your car talks to your home air conditioning, letting you know when you're on your way so it can adjust the temperature. The main use of Web 5.0 is that it will allow its users to control their digital identities.

However, what are the limitations of this advancement? One of the biggest challenges of Web 5.0 is the enormous amount of data it will have to process. Advanced artificial intelligence algorithms will be required to process the exponential increase in connected devices and their generated data. This will require computers with advanced infrastructure, which will not be available to everyone. The issue of privacy and data security is another limitation of Web 5.0. With the flexibility and expansion of their use, there will be a greater risk of data breaches and cyberattacks. To avoid them, researchers will have to implement robust security measures and protocols to ensure user data security and privacy. Finally, Web 5.0 will encounter challenges related to compatibility and interoperability. Web 5.0 will have to ensure integration and interoperability between multiple devices and platforms to provide an effective experience to its users.

In the field of netnography, scientific production on the relationship of this research approach with AI is virtually nonexistent. The database accessed for this article indicated that few researchers are dedicated to the topic, and when they do so, most of the published studies are produced in English, thus limiting the access of Brazilian researchers to the subject.

However, in the area of scientific research as a whole, some works address the theme of AI association with netnography and bring some points of reflection that can help to think about the AI that one wants to study.

The study by Passone and Vasconcelos (2024) develops an analysis bringing together the existing academic-scientific production in the area of education with respect to AI. This research shows that the construction that is sought to be developed for conscious use in this articulation has shown itself in a scenario still early and with great challenges, especially in what relates to public policies of incentive, the creation of new educational

models, the ethical issues involved, and the search for minimizing inequalities in the public and private sectors.

These and other challenges and benefits of AI applied to scientific research appear generally in various fields of knowledge that draw the attention of the academic community to understand its applications and build a better exploitation of the potentialities and functionalities that it can bring to research, expanding the scope of studies and presenting better results in contrast or in combination with traditional methods.

Costa (2023) discusses the relationship of AI with the scientific field in education, highlighting its potential for efficiency in this work. As with data privacy, the author must consider the risks and limitations of this connection. It explains the importance of the level of knowledge of the researcher regarding the use of available technologies so that the benefits can be perceived, achieved, and validated.

The concept of AI is complex and still under construction, especially in the field of scientific research. This scenario highlights the concept formulated by Morais; Santos e Gonçalves (2020, p. 107): “An artificial intelligence is a structure composed and articulated by software and possibly hardware, whose purpose is to assist human beings in decision-making based on the association of historical data and the recognition of patterns.”.

This concept does not exhaust the discussion necessary for the studies of the functions of AI applied to research but traces some significant aspects to understand the benefits of thinking about the integration of this tool for scientific research, evidencing itself as an aid to the researcher in the improvement of his work.

One of the examples of an AI function well known today is the ChatGPT (Generative Pre-trained Transformer). It consists of algorithms that interface with human intelligence. It offers everything from the simplest everyday tasks to the most complex ones. Giraffa and Santos (2023) emphasize the significance of understanding ChatGPT; they assert that the quality and intentionality of the questions determine the quality of the results. Therefore, the application’s research, comprehension of its operation, and intentionality determine the results obtained.

Studies on scientific research in different areas of knowledge highlight the benefits of AI. There are numerous possibilities as well as limitations to its use. However, many of these same studies make it clear that there is a need to deepen the interrelationship, or integration, between humans and intelligent machines.

Among the highlights are the challenges of using AI as a research method. One of them clarifies that this integration necessitates adaptations and support to ensure the survey’s validity and reliability. A second point posits that understanding the operation of AI is crucial for making informed decisions and maximizing its use in research (Smith *et al*., 2021; Guimaraes Junior *et al*., 2024). The third point relates to the nature of AI’s use in this context

and shows that, in many cases, AI can be an auxiliary tool for research. (Nichyhyna *et al*., 2023).

In addition to the benefits listed above, it has the potential to optimize the research process, improve decision-making, and broaden the scope of these studies. The study of Conceição and Chagas (2020) argues that these tools have demonstrated value in the dissemination of science and in the reduction of bureaucratic work, which is essential in the context of research, education, and society, enabling the researcher more time to devote to other issues and developments of his studies.

It is believed that netnography has adapted to cover the functions of AI in social contexts that emerged with the Internet (Webster; Silva, 2013). Conversely, it becomes evident that we must gather more data and, in doing so, create more studies that can deliberate on this issue and foster a more meaningful relationship. Even recognizing these aspects as beneficial, it is important to understand that AI does not replace the intentional action of the researcher in the production and analysis of data, since the nature of ethnography emphasizes the interactive human aspects.

Recent proposals, such as those of the UNESCO-United Nations Educational, Scientific, and Cultural Organization (2024) and Bengio (Existential Risk Observatory, 2024), are indicators of the concerns that AI has caused in the world.

Professor Yoshua Bengio, Scientific Director of the Mila-Quebec AI Institute, spoke during the AI Safety Summit, which took place on May 21, 2024, in the city of Seoul, South Korea, and expressed his concerns about AI security during the meeting. He said:

> We must address two primary issues to avert these potential disasters: a technical one and a political one. The first issue is how to ensure that the AI we build does not harm us, which encompasses various aspects, including the ability to assess if it poses a threat. The second aspect involves ensuring that AI not only stops when a problem arises, but also strives to ensure safety through its development. That's a political challenge because I think we need to solve this problem quickly, given the uncertainty in the timeline, so that when the AGI-Artificial General Intelligence [IAG-General Artificial Intelligence] arrives, we don't end up with more intelligent machines than we are and that we do not know how to control. Coordination is another issue, even if we understand how to construct a secure AI or accurately assess its potential risks. The seriousness with which different governments and civil society groups are addressing the issues surrounding the rapid development of border AI systems encouraged me. It is crucial that these stakeholders come together to think about how to mitigate the risks they pose to our democracies and societies. To start collaborating on an international scale, it is essential to establish the scientific positioning of the land on the risks and capabilities of these systems, which will serve as a common basis for the next steps (Existential Risk Observatory, 2024, Video file, 6'40'')

Bengio (Existential Risk Observatory, 2024) claims that AI can become able to pursue goals and perform actions in the real world—something not yet tried outside closed environments like some online chess games. These actions, he says, may be in conflict with human values. The professor identifies four ways in which AI can pursue goals that conflict with human interests. The main one would be humanity itself, from the perspective of human agents with malicious intentions instructing AI to do something bad. The second concern is that AI could receive inaccurate guidelines, either specified or described, and then draw conclusions based on these instructions. The third concern is that AI has the potential to develop its own sub-objectives while pursuing a broader human-created goal, which could potentially pose significant risks. Finally, Bengio argues that AI may end up developing a kind of evolutionary pressure so that they behave more self-centeredly, as animals do in nature, and thus ensure their own survival.

Bengio concludes that the development of new safety research, both at the technical and political levels, is necessary to mitigate these risks. He suggested a temporary ban on AI use to focus on real-world objectives and actions, rather than advocating for a complete ban on lethal autonomous weapons.

Just as Bengio and the AI Safety Summit speakers expressed concerns about the future of AI, UNESCO recently released the Guide to Generative AI in Education and Research (2024). This document aims to:

> To ensure that IAGen [IAG-General Artificial Intelligence] truly benefits and empowers teachers, students, and researchers, it is crucial to support the planning of appropriate human capacity development regulations, policies, and programs. The Guide is based on UNESCO's 'Recommendation on the Ethics of Artificial Intelligence', a human-centered approach that promotes human agency, inclusion, equity, gender equality, cultural and linguistic diversity, as well as pluralistic opinions and expressions. (Unesco, 2024, p. 1)

The UNESCO guide expresses points to be considered regarding the use and control of AI and warns of security and privacy issues that threaten AI users, especially in education. The text starts with an intriguing fact, expressed by an infographic that says: "While ChatGPT reached 100 million monthly active users in January 2023, only one country introduced, in July, a regulation aimed at generative AI." This call indicates the object of the study carried out and described in the guide: countries and their governments are envisaging the dangers of the Internet and may pay a high price for it.

The guide explains that Generative Artificial Intelligence (IAGen) "is an artificial intelligence (AI) technology that generates content automatically in response to written commands on natural language conversation interfaces" (UNESCO, 2024, p. 8). This indicates

that IAGen produces new content only by thoroughly visiting the web pages and taking advantage of their existing content. Symbolic representations of human thought, expressed in various formats, include texts written in natural language, images such as photographs, digital paintings, and cartoons, videos, music, and software codes. The document explains that IAGen learns from data gathered from web pages, social media chats, and other online media. IAGen generates its content by statistically analyzing the distribution of words, pixels, or other elements in the consumed data, and identifying repetitive patterns, such as the words that typically appear after other words. That is, IAGen produces new content, but it cannot generate new ideas or solutions to real-world problems because it does not understand objects or social relationships in this universe that is permeated by human language. Therefore, IAGen's accuracy cannot be trusted.

Finally, the guide argues that neither a top-down approach nor commercial exaggerations should drive the use of IAGen in education and research. Teachers, students, and researchers must co-design IAGen for its safe use, and it must undergo rigorous and ongoing evaluations.

The UNESCO guide and the lectures in Seoul highlight the ethical issues that need to be considered within the framework of AI and its tools. Some of the more specific issues include:

> ✓ Access and equity: IAGen systems in education have the potential to exacerbate existing disparities in access to technology and educational resources, further deepening inequalities.
> ✓ Human Connection: IAGen systems in education can reduce human interaction and the essential socio-emotional aspects of learning.
> ✓ Human intellectual development: In education, IAGen systems can limit students' autonomy and agency by providing pre-determined solutions or reducing the variety of possible learning experiences. We need to investigate its long-term impact on the intellectual development of young students.
> ✓ Psychological impact: Artificial systems that replicate human interactions
> ✓ They have unknown psychological effects on students, raising concerns about cognitive development and emotional well-being, as well as the potential for manipulation.
> ✓ Hidden biases and discrimination: As more sophisticated IAGen systems are developed and applied in education, they are likely to generate new biases or forms of discrimination based on the training data and methods used by the models, which can lead to unknown and potentially harmful results. (Unesco, 2024, p. 37)

Similarly, the blurred distinctions between private and public online interactions make ethical concerns crucial for netnographers. Hair and Clark (2007, p. 5) describe five ethical

dilemmas in netnography research: (1) the meaning of being “ethical,” (2) ethical philosophy, (3) codes of ethics-deontology, (4) outcome and use of research-teleology and utilitarianism, and (5) different approaches between management researchers and social scientists. According to Kozinets (2002, p. 65), the code of ethics for netnographic research is as follows: the virtual community must be fully informed about the presence, affiliations, and intentions of the researcher; the confidentiality and anonymity of the participants must be ensured; the researcher must seek and incorporate feedback from the members of the virtual community; and the investigator must obtain permission from the participants to use the specific posts.

AI is a reality in the world and in scientific research, and its spread has been super-accelerated. This has underscored the imperative to persist in generating knowledge in this field, enabling the exploitation of its benefits and the identification and correction of its disadvantages, thereby fostering the advancement of science and society.

In this sense, scientific research in general and netnography in particular must pay close attention to the advancements in AI to enhance its tools and thereby contribute to the effective development of safe and democratically accessible scientific processes. On the other hand, AI becomes an important object of research in netnography, in the sense of studying its effects and the ways of cultural production that emerge from it and in connection with it.

5 Final Considerations

Determining the scope and object of study presents a significant challenge in netnography, given the abundance of options for data sources, handling, and analysis. Inherent in the dynamics of networks, the processes of fluidity and dialogue between multiple interactive perspectives can be placed as obstacles to a clear definition of the researcher and the paths to be drawn towards the achievement of the research objectives.

The multifaceted nature of the Internet and the intersections of artificial intelligence and algorithmic interfaces, which influence the relationships established in cyberculture weaving, also position netnography as a critical-reflective problem. Pointing out the phenomenological and situational aspects of ethnographic research can be a way to seek answers, although this element does not exhaust the question.

Socio-anthropologists study the Internet’s contexts from a socio-anthropological perspective, addressing the challenges of co-presence in relation to or in opposition to the various texts that make up this space of meaning. The authenticity of the interactions mediated as contact for an ethnographic understanding is one of the problems faced, in addition to the selection of appropriate places to analyze the Internet as a culture and, at the same time, a cultural artifact (Hine, 2000).

In this perspective, netnography re-signifies and resituates the role and characteristic of immersion in the study locus, as well as the paper and emphasis in the research of face-to-face interactions. Internet research “focuses on experiential displacement rather than physical” (Hine, 2000, p. 44). The researcher’s interactions with the people he or she is studying, and the thing being studied take on unique shapes and require a constant process of reflection. This means that the researcher projects himself into the field and talks about his or her problems, looking for effective ways to approach mediated forms of communication.

The configuration of the modes of interaction with research participants in the context of mediation by technologies is part of netnography, as are the interactions of the ethnographer with technologies. This dialectical relationship constitutes, at the same time, a neuralgic point and a strong point of netnographic research. The references to broadening the scope of netnography lead us to the great challenge of the role of artificial intelligence, as well as the ethical question of the data and sources available on the Internet.

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