COLETÂNEA
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XIV

INFORMATION MANAGEMENT, EDUCATION AND TECHNOLOGICAL INCLUSION

Armando Malheiro da Silva
Francisco Alberto Severo de Almeida
Jorge Manoel Adão
Mário José Batista Franco

U.PORTO
FLUP FACULDADE DE LETRAS
UNIVERSIDADE DO PORTO

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INTRODUCTION

Information Management, Education and Technological Inclusion

Paula Maria de Carvalho Pinto Costa[1]
Jorge Manoel Adão[2]

The present Luso-Brazilian collection, entitled "Information Management, Education and Technological Inclusion" consists of an increase and socialization of academic-scientific productions at an international level. This Collection is organized into the following sections — Information Management, Education And Technological Inclusion — consisting of twelve chapters.

The first chapter, entitled "Adoption of the electronic market in SMEs: a comparative study between Brazil and Portugal", by Mário José Batista Franco and Margarida Rodrigues, presents a comparative case study carried out with eight Small and Medium Enterprises (SMEs) divided between Brazil and Portugal, with the aim of recognizing the main advantages and barriers

1 Director of the Faculty of Arts of the University of Porto — Portugal.
2 Postdoctoral fellow in information and communication science, Faculty of Arts and Humanities of the University of Porto-Portugal.

faced by these companies in the implementation of electronic market platforms (e-market). The results reveal that joining the marketplace provides significant benefits for SMEs, such as increased product visibility, access to a broad customer base, reduced operational costs and greater logistical efficiency. However, some challenges were also identified, such as fierce competition and compliance with sales policies. Therefore, this study shows the importance of this topic, highlighting the benefits and challenges that SMEs face when joining the Marketplace, also providing valuable insights for companies that wish to explore this type of business model and ensure success in a highly competitive environment.

The second chapter, "Digital information and communication technologies and emergency remote education in Goiás/Brazil", is authored by Carla Conti de Freitas, Ilza Martins Peixoto Lemos and Wilton Bernardes da Silva. It presents a discussion that justifies the importance and modification of the confluence of face-to-face classes to the digital environment in Emergency Remote Education in higher education from different social and cultural perspectives. The works mentioned in this article contribute to the writing process, intending to understand theoretical concepts to support the theme's contextualization, bringing essential aspects of digital information and communication technologies into education. And teaching and learning processes are converging in the digital world with the exchange of knowledge, going beyond the old traditional practices of education in higher education.

Authored by Rita de Cássia Martins de Oliveira Ventura, Armando Manuel Barreiros Malheiro da Silva and Mônica Erichsen Nassif, the third chapter has the following theme: "Information and its sharing: validation of a theoretical model in an organizational context". This text emphasizes that investigating information sharing in organizations involves facing contextual elements that intertwine and create a favorable or unfavorable environment for sharing behavior. The need to create and manage knowledge in organizations has already materialized as one of the ways for them to achieve some degree of differentiation in an increasingly egalitarian market. Technology has already established itself as one of the most important resources of our contemporary

times and, despite its importance, it is still treated as an appendage and not as a management tool embedded in organizations.

The fourth chapter, written by Armando Sérgio de Aguiar Filho, Armando Manuel Barreiros Malheiro da Silva and Ana Cristina Marques de Carvalho — entitled "The use of digital platforms to share information and knowledge" — consists in a qualitative analysis associated with a bibliometric study aimed at analysing academic-scientific production on the subject of "sharing information and knowledge through digital platforms". Initially, an exploratory documentary survey was carried out in the CAPES database to find out the number of scientific articles published on the subject in the last five years. The 150 articles surveyed were then content analysed and 32 articles were selected as the sample. The highest concentration of studies was found in 2020. The majority of the researchers were Brazilian, Chinese and Italian. The studies were published in journals in various fields, with emphasis on the areas of information science and sustainability. Internationally, most of the studies were published in Qualis A1 and A2 journals and in Brazil in Qualis A3 and A4 journals**.** The studies carried out showed that a range of digital platforms are being used to share information, such as online communities (social networks, blogs, company networks, collaborative crowdsourcing platforms, online review communities), websites, mobile applications and B2B operating systems. It can therefore be concluded that the study's objective was achieved. One limitation of the research is that it was carried out on just one database. It is suggested that future studies should be carried out on other databases that allow data to be collected from different sources, adding to the research.

The fifth chapter, by Sara André and Mário José Batista Franco, entitled "University-enterprise partnership in educational context: barriers and facilitators", investigates an educational partnership between a university and a technological enterprise set to provide a more accurate and targeted educational plan straight towards the company's needs. Therefore, this study aims to support the understanding of academic partnerships within technological enterprises in order to identify the perception and contribution of its main stakeholders by highlighting barriers and facilitators to this kind of partnerships. Bearing this

purpose, a qualitative approach was outlined through a phenomenological case study by interviewing three essential actors to this partnership — a business manager, an academic professor and three students. In general, all respondents recognised the added value of academic partnerships within the business sector, highlighting its advantages. However, some barriers and areas for improvement are also identified. This study allows to draw up a future development model to support and reinforce the success and continuity of this kind of partnerships. In a less explicit way, it allows to deepen the scientific knowledge around strategic partnerships between universities and enterprises especially those aiming to strengthen the connection between academic training and the needs of the business world.

The sixth chapter is written by Pollyana Pimenta Abud Rolim and Zenaide Dias Teixeira, entitled "Digital literacy and english language teaching-learning process", has as its main objective to investigate the main contributions and challenges of digital literacy in the teaching-learning process of English language. In addition to researching what the literature on digital literacy and English language brings, as well as raising the main processes used in digital literacy involving English language. The question that guides this research is: what are the main contributions and challenges of digital literacy in the teaching-learning process of English language? The research has a bibliographical and analytical nature. For the theoretical foundation, authors such as Alharbi (2020), Araújo and Rocha (2020), Berbert (2020), Bottentuit Junior (2020), Anjos and Santos (2014), Moita Lopes (2010), Buzato (2009), Morin (2007) and Freire (1996).

Under the title "The use of digital technology in education: Information management strategies to promote technological inclusion", the seventh chapter is written by Adna dos Santos Lemos, Camila da Silva Oliveira Monteiro e Andréa Kochhann. This article aims to analyze how the integration of digital and technology in education, combined with information management strategies, can contribute to promoting technological inclusion and improving the teaching-learning process. To achieve this goal, the research addresses the following specific objectives: investigate how digital technology is being integrated into education as a mediator of learning; analyze how information management

can be applied to support the effective implementation of digital technology in education, and identify the challenges associated with the use of digital technology in promoting technological inclusion. The guiding question of this study is: how can the use of digital technology in education, combined with information management strategies, contribute to promote technological inclusion and improve of the teaching-learning process? The methodology employed in this research is qualitative, being a documentary and bibliographic study, in order to establish a solid foundation for the research. In addition, a questionnaire will be administered to teachers in the basic education system affiliated with the GEFOPI group to collect empirical data. Qualitative data analysis will be conducted, including the categorization of responses, identification of emerging themes, and recurring patterns. The results of this study suggest a positive perception of the role of digital technology in education, highlighting its potential to enhance the quality of teaching through innovation, accessibility to diverse resources, and student engagement.

The eighth chapter, written by Adelson Moreira Santos and Jorge Manoel Adão and entitled "Pedagogical practice and the use of educational technologies: challenges and achievements", is covered the challenges and achievements that teaching practice achieved in the use of educational technologies in the pandemic context that settled in the world, in the period of 2020-2021, through applied, quantitative and qualitative research and the case study, through a mixed questionnaire prepared by Google Forms and sent to the teachers of the Administration and Pedagogy courses at the Silvania University Unit, Goiás state (GO), of the State University of Goiás. With the help of the authors Santaella (2013), Schuartz and Sarmento (2020), Castells (1999), Teixeira (2002), Moran (2007) and Goiás (2020), we identified overwork and ignorance of the use of educational technologies as key challenges. As achievements, the authors recognise the learning that took place during this challenging period and the empathy developed in response to the difficulties faced by the students..

In the ninth chapter, entitled "Technological inclusion in youth and adult education: possibilities and limits of a university extension project" — written by Maria Eneida da Silva, Ivanisia Dias Galvão and Gislene Lisboa de

Oliveira -, the authors bring an excerpt from an investigation that analyzed the technological inclusion of Youth and Adult Education students from the *UEG Integra* extension project and has the following research problem: what are the possibilities and limits of the *UEG Integra* extension project for the technological inclusion of students from the 1st to 4th stages of Youth and Adult Education at a public school in Samambaia, Distrito Federal? The theoretical foundation relies on studies by Franco (2003); Bueno and Gomes (2011); Lourenço, Pelozo, Vieira and Vieira (2012); Santos (2016); Amparo and Furlanetti (2011), among others who discuss the topic. From the raised problem, the general objective is to analyze the possibilities and limits of the *UEG Integra* extension project for the technological inclusion of students from the 1st to the 4th stage of Youth and Adult Education at a public school in Samambaia, Distrito Federal. To this end, the section presented in this chapter brings a qualitative investigation, literature review and field research with analysis of mixed questionnaires conducted under the interpretivist paradigm (Yin, 2001; Bortoni-Ricardo, 2008). As a result, the authors infer that one of the possibilities for technological inclusion of Youth and Adult Education students was provided by the workshops of the *UEG Integra* project which had as one of the activities learning to use bank ATMs and electronic voting machines; and some of the limits are linked, mainly, to the lack of student attendance, as well as the fact that the project was not designed for at least the entire academic year — or more — so that students had enough time to learn what was proposed and what they wanted/needed.

Titled "The production of meaningful learning in history teaching, meeting the requirements of BNCC and law 10.639/2003", the tenth chapter was written by Jeferson Carvalho Mateus, Francisco Ramos de Melo e José Leonardo Oliveira Lima. This text emphasizes that the theory of meaningful and learning has Ausubel (1982) as its main theoretician and seeks to highlight the importance of valuing the student's prior knowledge as a kind of basis for the production of new knowledge. The general objective of the research is to analyze how the use of technologies can contribute to the creation of meaningful learning contexts in the teaching of History, working specifically with the black and afro-descendant theme, also based on the proposals of the Curriculum Parameters

of the Base National Common Curricular, and to present a case of application in the teaching of content to high school students. The methodology used in the research was a bibliographic review, document analysis and, later, the analysis of how, in practice, the use of technology in the classroom could be done, with students of the 3rd year of High School. The research demonstrated that it is possible to use technology in the production of meaningful learning, as proposed in the format of a guide in this work, in which it is essential to plan classes, value the knowledge that the student has, motivation for learning, generating possibilities for the student to produce new knowledge and that these are significant in their life context.

The features eleventh chapter is written by Ana Carolina Martins Severo de Almeida and Francisco Alberto Severo de Almeida; and, has as its theme "Analysis of the electronic legal process system implemented in the brazilian labor court: an empirical study". In this text, the authors highlight that the object of this empirical investigation is the analysis of the Electronic Judicial Process System-PJE, implemented by the Labor Court in Brazil, based on the epistemology computerization of the judicial process, public management and procedural legal governance. The results obtained in this scientific investigation provide evidence that the PJE is a technological tool capable of ensuring procedural speed and efficiency in public judicial management. In addition to promoting legal certainty and the effectiveness of justice, it also brought a series of innovative transformations on the judicial services provision. This inference is based on the results obtained in relation to analyzed variables data sets. What is also noteworthy is the agility of decisions related to administrative and procedural management. In addition to the temporal reduction of the process between the filing of the action and the result of the sentence.

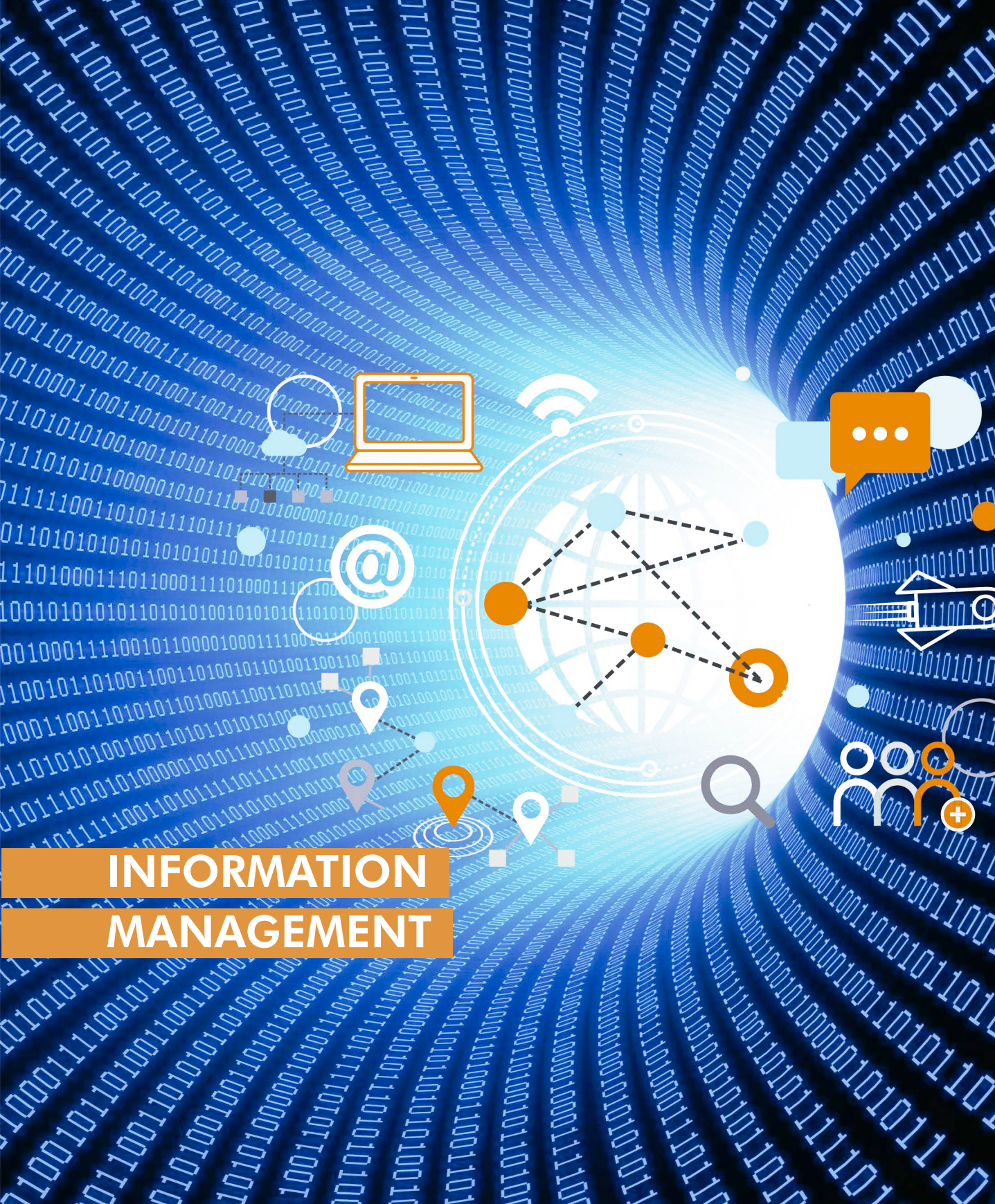
Finally, titled "Information Management of SMEs in Portugal (North and Center): technology data extracted from the GIPMEI project", the twelfth and final chapter is authored by Armando Malheiro da Silva, Sónia Catarina Lopes Estrela, Eliane Pawlowski de Oliveira Araújo, George Leal Jamil and Claudio Roberto Magalhães Pessoa. This investigation points out to the need to support and enable SMEs to adopt good IM and ICT practices, which support them adequately, in order to improve their performance, as well as

the importance of making entrepreneurs aware of the added value of adopting these good practices. The urgency of promoting training for managers and workers (developing information and technological literacy skills) and the intervention of information managers in organizations to diagnose problems, identify and implement the technical and technological solutions best suited to the characteristics and needs of companies were equally realized.

Our deepest thanks to the researchers, who sent us, in the form of texts, the growing and harvested fruits of their primary investigations.

Consisting of the 12 chapters we have just presented, this book corresponds to volume XIV of the Luso-Brazilian Collection, specially dedicated to 'Information management, education and technological inclusion', developed under the coordination of Armando Malheiro da Silva, Francisco Alberto Severo de Almeida.

Jorge Manoel Adão and Mário José Batista Franco. Considering the tradition of academic collaboration between FLUP and UEG, with a particular focus on the area of Information Science, this volume attests to the consolidation of shared scientific interests between the two institutions and the opening of horizons for future research and initiatives.


INFORMATION
MANAGEMENT

CAPÍTULO 1

Adoption of the electronic market in smes

A comparative study between Brazil and Portugal

Mário José Batista Franco
Margarida Rodrigues

With the growing demand for the use of new technologies, companies have had to adapt and adhere to new business models in order to operate competitively and innovatively. In this context, the electronic market (e-market) is one of the differentiators for organisations, bringing speed and practicality to negotiations with customers, making it possible to carry out transactions from anywhere in the world, without the need for physical contact, offering numerous benefits to its users (Choshin and Gahffari, 2017). With the growth and development of the electronic market worldwide, all companies, regardless of their size, can adopt and exploit the new business opportunities that arise, thus managing to respond to the constantly changing needs of their consumers (Dwivedi *et al.* 2020; Nambisan, 2017; Troise *et al.*, 2022).

As mentioned above, the use of this instrument has no size guidelines (e.g., Dwivedi *et al.* 2020), which points to the role that small and medium-sized enterprises (SMEs) play in providing entrepreneurial skills and innovation

for countries' economies, which is why governments have paid special attention to them, as they play a fundamental role given their potential to generate wealth and jobs, making them important from both a social and economic point of view. However, they have limited resources and are part of a highly competitive market, where they need to innovate and differentiate themselves more and more from their competitors, which is a major challenge for SMEs; this means that the managers of these SMEs need to consider implementing the e-market as a growth strategy, improving their dynamics and increasing their organisational capabilities (Arenas *et al.*, 2022). In addition, the restrictions and disruptions imposed by the pandemic have changed consumers' purchasing behaviour, for example, Amazon's marketplace has continued to grow by an average of 35% every quarter since 2017; Shopify has increased its turnover more than tenfold in the last five years, reaching revenues of almost 3 billion dollars in 2020 (Amazon, 2022, Ballerini *et al.*, 2023). This means that, faced with these scenarios, entrepreneurs need to be resilient in order to face the consequences (Lu *et al.*, 2020) as this is what will enable companies to continue to survive in turbulent environments (Beech *et al.*, 2019), so SMEs must increasingly take advantage of digital resources, new ways of selling, as consumer habits have also changed (e.g. change in priorities, choice of online) in order to continue to grow (Rodrigues *et al.*, 2021).

It is clear that SMEs are facing yet another challenge, namely the implementation of the electronic marketplace in their businesses, where previous studies have shown that, even in the face of numerous advantages, small businesses still have low rates of adoption of the electronic marketplace, demonstrating reluctance and difficulty in adhering to it Duan *et al.* (2012). Therefore, exploring this topic brings numerous benefits for companies, including the ability to keep up with the constant changes taking place in the competitive business environment; managers need to be prepared to adapt to these changes, through flexible leadership it is necessary to implement innovative practices in companies, to face crisis scenarios and create long-term value for the organisation (Maas *et al.*, 2019; Schoar, 2010), in which only those who can adapt quickly to disruptive environments will survive (Liguori and Pittz, 2020.). Specifically, the aim is to answer the following research questions:

- QI 1 — What is the current state of adoption of the electronic marketplace in Portuguese and Brazilian SMEs?;
- QI 2 — What are the main positive points and challenges that companies have faced with its adoption?

These questions are justified by the fact that in Portugal, in 2022, 67% of people shopped online, representing a 5% increase on the previous year; total online sales exceeded 130 billion euros in 2022, according to estimates by the Association of Companies and Professionals in the Digital Economy in Portugal (ACEPI) (2022). Brazil, on the other hand, recorded record turnover via e-commerce in 2021, 161 billion reais, an increase of 27% compared to 2020; in the same year, the number of visits to physical shops fell by 40.12% compared to 2019, according to research by the Brazilian Society of Retail and Consumption (SBVC) and the Retail Performance Index (IPV) (2022), but the initiative of this type of business to invest in e-commerce was assertive and quick, and gave companies back a good part of the turnover lost in physical sales according to the Micro and Small Business Support Service (SEBRAE) (2022).

After this brief introduction to the topic under study, the next section will present a contextualisation of electronic commerce (e-commerce) and its importance, addressing concepts and advances, describing the different categories of e-commerce, with the main focus on the e-market concentrated in Brazilian and Portuguese SMEs, providing relevant information and up-to-date data on the use of marketplaces in these countries. The methodologies used are presented next. Then the main results and discussions are presented. Finally, the study's conclusions are considered along with the contributions, limitations and suggestions for future research.

LITERATURE REVIEW

Beynon-Davies (2018) argued that the use of the internet to conduct business has transformed the conventional way of doing business between physical companies, with several advocates claiming that it is necessary to adopt these technologies early in order to achieve business sustainability in the case of

SMEs. However, e-commerce emerged in the 1980s, initially focused on sales in virtual environments, such as teleservice and telesales, replacing physical contact with virtual interactions (Mendonça, 2016). Drucker (2002) states that this was responsible for the revolutionary boom of the internet, making it one of the main global distribution channels, affecting the economy, markets, industry structure and consumer behaviour. According to Chang and Wong (2010), it is structured into three categories: e-shopping (led by buyers), e-distribution (led by sellers) and e-marketplace (online intermediation between buyers and sellers, facilitating transactions).

It is important to emphasise that the focus of this study is on the e-Market, also known as the marketplace, highlighting the virtual interaction between buyers and sellers as a very important element of e-commerce, especially for SMEs, as argued by Mendonça (2016). Over the years, the e-commerce market has grown more and more, especially after the Covid-19 pandemic, which revolutionised consumers' shopping habits, as they were unable to make purchases in person and were driven to buy more and more online (Vázquez-Martínez *et al.*, 2021).

A marketplace can be defined as a virtual shopping centre, an e-commerce site that brings together offers of products and services from different online shops in a wide variety of categories, unifying the shopping experience, the cart, payment and even delivery in many cases. The e-market does not redirect consumers to third-party sites, and by concentrating the entire experience on its platform, the consumer becomes a customer of the marketplace, since it is with them that they have a direct relationship, even if the shopkeeper delivers the product. In order to participate in this site or virtual platform, shopkeepers pay a fixed monthly fee or commission on their orders. There are several types on the market, covering the most diverse business needs, such as Amazon, Olx, Shopee, KuantoKusta, Uber, Mercado Livre and many others (Chang and Wong, 2010; Standing and Standing, 2015). A company can own an e-commerce store and participate in a marketplace at the same time. According to Turban *et al.* (2015), the main components and participants in an e-marketplace are: customers, sellers, e-retailers, products and services (physical or digital),

infrastructure, front-end, back-end, intermediaries and other business partners, as well as support services such as security and payments. Through the virtual marketplace, it is possible for various buyers, sellers and other interested parties to communicate and relate to each other in a dynamic space (Stockdale and Standing, 2004).

This type of commerce is particularly crucial for SMEs as they play a key role in the economic growth of many countries, contributing to job creation, GDP growth and reducing inequalities; in both developed and developing countries, these companies are recognised as sources of innovation (Pereira and Franco, 2022; Franco, 2021). In this context, in Portugal, e-commerce has experienced a significant increase in uptake, driven by the pandemic and the war in Ukraine. Online purchases of Portuguese products in 2021 exceeded 5.5 billion euros, with a growth of 36.2% compared to 2020. The B2C e-commerce market in Portugal is estimated to have reached 10 billion euros, highlighting the growing importance of online sales. In addition, the use of marketplaces and apps for online sales is expected to increase (European Commerce [EC] and EuroCommerce, 2022). At the same time, in Brazil, e-commerce grew by 12% in the first half of 2019, reaching a turnover of 26.4 billion reais in the second half; the volume of orders increased by 20%, totalling 65.2 million orders; sales through mobile commerce were especially relevant for non-durable consumer goods, such as food and beverages (Nielsen, 2019, cited by Sousa, Klein and Voese, 2021). This data emphasises the importance of e-commerce for companies, boosting their competitiveness and market presence. However, SMEs face challenges in adopting digital solutions due to knowledge gaps and limited resources. The ability to integrate different sales channels into a unified platform is a relevant factor for successful online sales. Therefore, SMEs are looking to develop their digital business models through marketplaces and social networks, enabling organic growth and increased interaction with customers (Sousa *et al.*, 2021).

Like any business model, digital or not, companies adopt the use of a technology when they realise that they can use it as an advantage that brings opportunity to the business and makes it overcome challenges, so the greater

the benefit, the more likely the company is to adopt this technology, thus generating a perceived benefit (Rogers *et al.*, 2019). According to Joo and Kim (2004), this perceived benefit can be categorised as direct and indirect. The direct benefit is associated with the reduction in operating costs and the material gains that companies have when they adopt the electronic marketplace, for example, the greater reach of customers and savings in operating expenses. The indirect benefit is related to the impact of adopting e-marketing on process management and customer relations, with the aim of improving the company's image, increasing operational efficiency and improving relations with business partners (Daniel *et al.*, 2004; Kuan and Chau, 2001). The benefits of adopting an e-market are shown in Table 1.

Table 1 — Benefits of the e-market

Benefits	Authors
Wide customer reach One of the biggest advantages is increasing your ability to reach new customers, even on a global level. With more detailed information about your customers, you can build better relationships with them.	Kawa and Walesiak (2019); White and Daniel (2004)
Low barrier to entry It's easy to enter, you don't need a lot of investment or specialization in the subject, through simple and intuitive learning, anyone can use and sell on the marketplace.	Kawa and Walesiak (2019); Stockdale and Standing, (2003)
Flexible administration and communication Managers can monitor their company from anywhere in the world and at any time.	Deeter-Schmelz *et al.* (2006); Lin and Hsieh, (2000)
Ability to compete with larger companies Any company, regardless of its size, can utilize the electronic marketplace and compete in the same environment as larger companies.	Korchak and Rodman, (2001)

Benefits	Authors
Sales support and logistics Marketplace platforms offer customer support and facilitate logistics, which makes the relationship with the consumer viable and simplifies sales for companies**.**	Kawa and Walesiak (2019)
Trust With transactions, the protection of the system, and the permanence of the relationship during the operation of the system, it transmits reliability, for example, customers can make secure installment payments and sellers offer detailed and effective information about the product on sale.	Casaló *et al.* (2008); Connolly and Bannister, (2008); Pavlou and Gefen (2004)
Reduced advertising costs When companies are included in the marketplace, they have more visibility, advertising costs are also reduced, and th e ads are online, so the brand is recognized and valued.	Ramanathan *et al.* (2012)

One of the main reasons for the low adoption of the electronic marketplace by SMEs is the lack of understanding of its benefits for their company, because they feel they are not well qualified to join this new business model, many companies avoid seeing the importance of these advantages for their organization (Goode, 2006; Poon, 2017). The main challenges that companies encounter when using marketplace platforms are shown in Table 2 and some of these reasons also concern companies that do not use the electronic marketplace.

Table 2 — Challenges of the electronic market

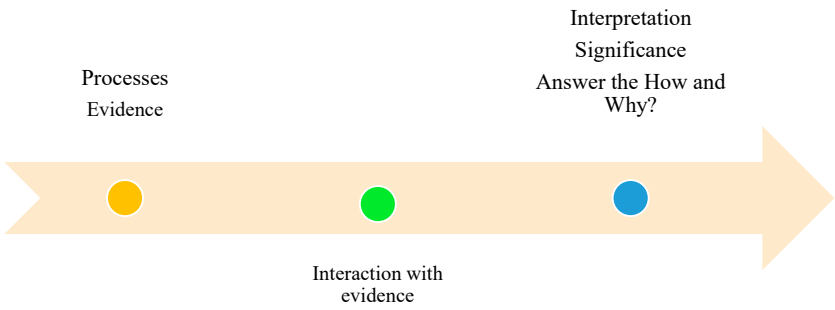
Challenges	Authors
Lack of resources and knowledge Many companies are not interested in studying and keeping up to date on the association with electronic markets due to the belief that they require high investments, resulting in lost business opportunities.	Mehrtens *et al.* (2001)
Data and information security Carrying out transactions online poses the risk of data theft for both companies and customers.	Ghobakhloo and Tang (2013)
Pressure to meet customer needs SMEs face significant pressure to meet consumer demands in electronic markets.	Rahayu and Day (2015)
Fierce competition The fierce competitiveness of the environment in which they operate leads SMEs to underestimate their size and capacity, generating a sense of powerlessness.	Korchak and Rodman (2001); Kawa and Walesiak, 2019)
Sales policies and commissions Frequent changes in sales policies require companies to be constantly updated to avoid losses. Commission rates on sales, depending on the marketplace platform, can have an impact on organizations' financial results, especially for SMEs.	Stockdale and Standing, (2004); Korchak and Rodman (2001); Kawa and Walesiak (2019)

METHODOLOGY

According to Gerhardt and Silveira (2009), methodologies are the paths that must be taken to carry out a study and thus achieve what is called science. According to the same authors, an investigation is carried out to obtain an answer to a problem raised by the author and this answer must contribute to scientific knowledge using a specific method for this: the scientific method.

To answer the two research questions defined in the Introduction, we used qualitative methodology, which according to Patton (1990) allows us to analyse results obtained from individual cases, which provide more detailed, rich and useful information about the phenomenon to be observed. Yin (2015) also pointed out that this method is based on the case study. As for Silverman (2000), this method is characterised by the holistic emphasis associated with the treatment of the phenomenon under study. For Major & Vieira (2017), this type of research is characterised by strong internal validity, but weak external validity, given that social phenomena are studied in real environments. External validity is supported by the answer to the how and why (Yin, 2015), so case studies are rich in depth and privileged information (Geertz, 1973). Clearly, this method implies the interpretive paradigm (Dubé and Paré, 2003; Major & Vieira, 2017), whose holistic chain is shown in figure 1.

Figure 1 — Holistic Chain of the Interpretive Paradigm



Source: Own elaboration.

However, in order to achieve a proper interpretation and understanding of meaning, the use of primary data is crucial, particularly that obtained through semi-structured interviews, to which secondary sources can be added. Semi-structured interviews are based on a formal category, but they allow the interviewee to respond informally, feeling free of formalities and able to mention and favour particular opinions. According to Sparkes and Smith (2013), the qualitative study consists of the format of interviewing so that the answers are in line with the opinions and experiences that the interviewees have lived through.

In this context, the case study presented was guided by the methodological procedures shown in figure 2.

Figure 2 — Case study procedures, adapted from Yin (2015)

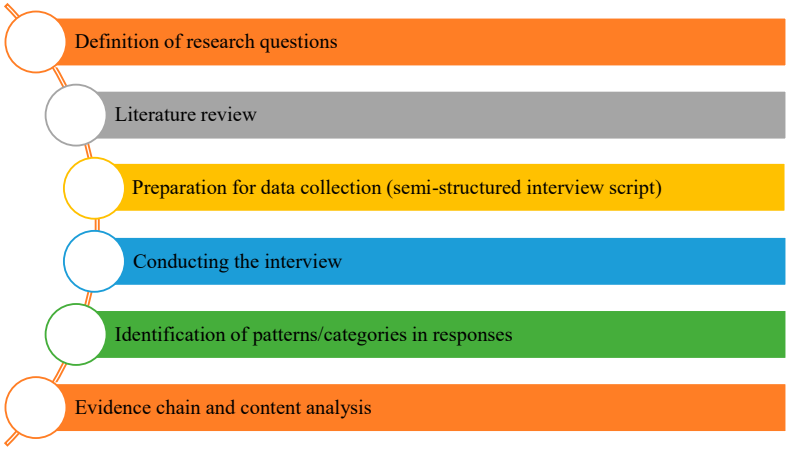


Figure 2 - Case study procedures, adapted from Yin (2015)

Data was collected through multiple case studies using semi-structured interviews to obtain various perspectives and opinions on the same situation (Bogdan and Biklen 1994; Tuckman, 2002; Quivy and Campenheoudt, 2003). The literature review was then combined with a field study, using the comparative method in order to reach an agreement between the two countries.

Through an inductive sample, the companies interviewed were selected and the criteria were: being a small or medium-sized company, regardless of the sector in which they operate, their geographical location, use of the market-place and availability to take part in the study. The interviews were carried out individually with representatives of the selected companies and were conducted face-to-face, by telephone, WhatsApp and via videoconference, depending on the availability and preference of the participants (Patton, 1990).

To conduct the interview, it is necessary to use more relaxed language, where important points and questions for the research were addressed. The interviews were conducted using an interview script adapted from various authors found in the literature (Matos, 2019; Pinto, 2019; Gomes, 2013). A total of 8 interviews were conducted, 4 from each country, as shown in Table 3. The aim was to obtain specialized and insightful perceptions on the subject of the study, considering the particularities and nuances of the Brazilian and Portuguese contexts (Patton, 1990).

The interview script, made up of 20 open questions, aims to obtain information such as motivations, challenges, competition, customer relations, stock management, and platforms used, among other relevant aspects.

Table 3 — Interviewee information

Company	Activity	Start Year	Country	Website c/ e-commerce	Use of adverts	Market-places
A	Commercial	2018	Brazil	Yes	Seasonal	*Americanas, Madeira Madeira e Submarino.*
B	Commercial	2019	Brazil	Yes	Seasonal	*Amazon, Americanas, Carrefour, Kabum, Magalu, Mercado Livre, Shopee e Via.*

Company	Activity	Start Year	Country	Website c/ e-commerce	Use of adverts	Market-places
C	Commercial	2022	Brazil	No	Frequent	*Amazon, Americanas, Mercado Livre e Shopee.*
D	Commercial and Services	2020	Brazil	No	Seasonal	-
E	Commercial and Services	2019	Portugal	Yes	Frequente	*Meta, KuantoKusta, OLX.*
F	Commercial and Services	2017	Portugal	Yes	Seasonal	*Booking, Booked, TripAdvisor e Glovo.*
G	Industry	1978	Portugal	No*	Seasonal	-
H	Services	2018	Portugal	Yes	Seasonal	TripAdvisor

After collecting the data, a qualitative analysis of the results obtained in the interviews was carried out. This involved identifying recurring themes, patterns and relevant insights in the participants' responses. The answers were grouped together and checked in an attempt to identify the main differences and similarities between the companies in the two countries. The data collected was compared and interpreted in relation to the research questions and the literature review.

1 Although they have the e-commerce structure ready on their website, it is not enabled, so it was considered that the company does not have it.

RESULTS AND DISCUSSION

Technological advances have contributed significantly to the growth of the electronic market, as described by Silva (2018). Alves (2017) mentioned that organisations need to adapt to technological evolution and digital trends in order to meet the needs of the environment. Of those interviewed, 6 out of 8 said that they were aware of this evolution and were well positioned and adapted to market trends. Table 4 shows a macro view of the results of the study, demonstrating the main benefits of implementing electronic market platforms.

Table 4 — Summary of the benefits reported

	Companies							
Reported benefits	A	B	C	D	E	F	G	H
Wide customer reach	✓	✓	✓		✓	✓		✓
Low barrier to entry	✓	✓	✓		✓	✓		✓
Flexible administration	✓	✓	✓					
and communication			✓			✓		✓
Ability to compete with larger companies	✓	✓	✓		✓	✓		
Sales and logistics support	✓	✓	✓		✓	✓		✓
Trust	✓	✓	✓		✓	✓		✓

Table 4 shows that the benefits unanimously reported by the respondents were: a larger customer base, easy entry, sales and logistics support, the trust that customers have in the platform, the reduction in costs related to conventional adverts (TV, Radio, Flyers) and the advantage of using online adverts due to their reach and visibility.

In the beginning, Company A was moulded to be a B2B business, there was no e-commerce or use of sales platforms, only sales via whatsapp in direct contact with customers. When they realised that sales were not going according to plan and with a considerable stock of products lying idle, they moved on to B2C sales, and it was then that the marketplace became part of the company's day-to-day business, according to the report: "[...] first we used the strategy of selling on marketplaces because it was an audience that was more accessible and it's a bigger showcase. And then we didn't even know how anything worked, we didn't even have e-commerce, the website wasn't finalised. And in the marketplace, whether you like it or not, it's much more intuitive, easier." This account, like the other interviewees who use the electronic marketplace, shows how visibility and reach is something that is perceived and praised among users of the platforms, as found by Kawa and Walesiak (2019).

Companies A, B and C were born digital, i.e. they don't have a physical space to receive their customers and demonstrate their products, interviewees B and C went straight to the marketplaces, according to them it didn't make sense to have a physical shop and start a process of creating brand value when these platforms already offered greater visibility and credibility, which is in line with studies by EC and EuroCommerce (2019), which states that e-commerce has been growing rapidly due to its importance in companies' business models today. However, Company B commented that in the beginning it was to grow sales of the e-commerce itself, to reinforce the brand, but abandoned the idea very quickly because it realised that the platforms gave greater credibility to the consumer, which corroborates the arguments of Pavlou and Gefen (2004), Connolly and Bannister (2008) and Casaló *et al.* (2008).

All the companies interviewed use Meta's social networks, Instagram and Facebook, for their organisations' digital presence, which increases visibility and brand recognition, depending on the algorithm and the use of adverts, and consequently boosts sales. Company D, for example, uses adverts on the platform to attract customers to direct, as well as to redirect them to the shop's whatsapp, so they have closer contact with their customers and don't use marketplaces or e-commerce for their sales, like Company G.

Companies A and B, because they use Meta's adverts on a seasonal basis, mention that when they use adverts their own e-commerce sales increase exponentially compared to the e-market.

Interviewees D and G, as already mentioned, do not have e-commerce or marketplace platforms in operation at the time this study was conducted. They were included in the study because, although they do not use these platforms, they are planning to use the advantages of online sales in the future. In the case of company G, the issue is a little more delicate because, as they said, "we don't use them because there is a lack of internal structure to fulfil small orders and difficulties with logistics in general." As they are a ceramics manufacturer, they are not yet ready to serve the B2C market, and when asked why they don't use e-commerce for B2C sales, they were unable to answer.

When we compare the samples between the two countries, Brazil and Portugal, the Brazilian companies seem to be more motivated to adopt the online business model, where ¾ of the sample do not have a physical shop and only use electronic marketplace and e-commerce platforms.

With regard to implementation challenges (table 5), after analysing the interviews in this study we agree with Mehrtens *et al.* (2001) when they say that there is a belief that using these platforms requires high investments and specialised knowledge for implementation. Despite the existence of the possibility of data loss, as stated by Ghobakhloo and Tang (2013), there was no concern regarding this issue among the respondents because, again, trust in the platform is highly related.

Table 5 — Summary of the challenges reported by the participants

	Companies							
Challenges reported	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Lack of resources and expertise								
Data and information security								
Pressure to fulfill								✓

	Companies							
Challenges reported	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Needs		✓	✓			✓		✓
Strong competition	✓		✓			✓		

With regard to competition, as commented on by Korchak and Rodman (2001), Companies B, C, F and H reported it as a challenge. Company E responded as follows: "we don't see ourselves as competitors, but as partners, there's room for everyone", while Company B said "there's no way we can compete with the big brands, there are prices we can't cover [...] as we sell branded products the prices are already tabulated, but there are people who sell their products below cost [...]". ...] as we sell branded products, the prices are already fixed, but there are people who sell their products below cost [...]", which goes against the idea of Korchak and Rodman (2001), who argue that SMEs can compete with larger companies.

FINAL CONSIDERATIONS

This study analysed the importance of e-commerce for SMEs, highlighting its relevance in Portugal and Brazil. Through an investigation of the literature, it was possible to understand the electronic marketplace and identify its main benefits and the challenges they face when implementing the platform in their organisation. In response to the research questions defined, the following stand out: a) IQ -1 — in relation to the current state of adoption of the e-market in Portuguese and Brazilian SMEs, it was found that the level of adoption of the e-market in SMEs is still considered low, even with growing progress, especially in Portuguese companies located in smaller regions, as was the case with most of the companies interviewed in the Covilhã region, they still encounter difficulties and are very reluctant to join. Brazilian companies use the e-market more frequently, it is worth noting that social networking tools boost this factor, being used in a fundamental way to publicise and insert themselves

into the online sales market, all the Brazilian companies interviewed use the e-market as a sales and brand recognition strategy; b) IQ — 2 — regarding the positive points and challenges they have faced with the adoption of the platforms, it was found that the advantages vary from easy access to global markets, easy installation, greater brand visibility, the ability to reach more customers, the credibility and trust that the platform brings, support and logistics. The challenges, according to the participants, are competition with big brands and adapting to the marketplace platform's sales policies.

The study makes a significant contribution to the scientific community, providing important results and information that can serve as a basis for small business managers to realise the importance of joining the electronic market, considering that the barriers are lower than they think. Specifically, SME managers should realise that e-commerce brings numerous benefits to SMEs, as it acts as a catalyst for innovation and growth, of which the following stand out: 1) Access to Global Markets — e-commerce allows SMEs to reach customers beyond their immediate geographical locations, opening doors to global markets. This significantly expands customer potential and sales opportunities; 2) Cost Reduction — Online operations reduce the need for expensive physical infrastructures such as shops and offices, thus lowering operating costs. In addition, many manual tasks can be automated, saving time and resources; 3) Flexibility and Convenience — e-commerce provides flexibility for both the entrepreneur and the consumer, allowing for 24/7 operations. This also offers convenience to customers, who can shop anytime and anywhere; 4) Personalisation and Data Analysis — e-commerce technology allows for the collection and analysis of customer data, which can be used to offer a personalised customer experience and continuously improve the product and service offering; 5) Improved Customer Experience — With the ability to provide detailed product information, secure online payment options and effective customer service, SMEs can improve the customer shopping experience; 6) Adaptability — The online environment is highly dynamic and e-commerce allows SMEs to adapt quickly to changes in the market, whether in terms of products, prices or marketing strategies; 7) Sustainability and Eco-efficiency — With less need for physical infrastructure and leaner operations, SMEs can operate more

sustainably, reducing their ecological footprint; 8) Innovation — e-commerce often stimulates SMEs to innovate, whether in terms of products, services or operational processes, in order to remain competitive and relevant in the digital market; and 9) Partnerships and Collaborations — e-commerce platforms facilitate partnerships and collaborations with other companies, influencers and brands, creating opportunities for joint marketing and other collaborative initiatives. In short, the integration of these advantages, aligned with a well-planned strategy, can help SMEs thrive, increasing their competitiveness and long-term viability in the global marketplace. However, this integration is yet another challenge for SMEs, as success in e-commerce requires them to proactively address these challenges by investing in technology, training, strategy, and operations to build a robust and resilient online presence.

The study's limitations are recognized since the case study was conducted on only eight companies, divided between Brazil and Portugal, which means that the results and conclusions presented are not saturated. For future research, it is suggested that other methodologies be used, such as surveys or questionnaires, for example. On the other hand, carrying out a single case study with just one company would enable a more detailed understanding of some key issues. Finally, it would be advisable to analyze only similar companies, i.e. those operating in similar sectors of activity or dedicated to selling similar products and/or services. Such an analysis could make it easier to identify the products or services that benefit most from the use of these platforms by SMEs.

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CAPÍTULO 2

Digital information and communication technologies and emergency remote education in Goiás/Brazil

Carla Conti de Freitas
Ilza Martins Peixoto Lemos
Wilton Bernardes da Silva

With the transformations in contemporary society over the last few decades, advances in technological resources have also brought about transformations in ways of teaching and knowledge since "[...] current conceptions of learning that show the action of teaching can provoke different types of learning" (Kachar, 2001, p. 33[1]). The encounter of consciences in the educational process enriches the moment in which the exchange of knowledge takes place in the timeframe in which the human development of the individual within society is founded. The sending and receiving of messages occur between people actively around the perception of information. The communication agents alternate roles so that dialogues can be built in multiple social dimensions, creating, and giving meaning to the themes addressed at an unprecedented moment.

1 Free translation from the original, "[...] as concepções atuais sobre aprendizado que mostram a ação de ensinar podem provocar diferentes tipos de aprendizagem" (Kachar, 2001, p. 33).

Pinto (2007, p. 587[2]) states, "if we want to elucidate the concept of learning, we believe there is no one who objects or doubts that it is a process that can only occur in a social context." In this sense, the theme of this article is Digital Information and Communication Technologies (DICTs), with a focus on their use in Higher Education during the period of Emergency Remote Education (ERE) due to the Covid-19 pandemic.

With this in mind, we started with a problematization related to digital information and communication technologies in the understanding and knowledge of Higher Education professors about technologies during the period of ERE. From this perspective, the general aim of this article is to discuss digital information and communication technologies in higher education during the period of ERE in Goiás, in the light of Freire (1979, 1996, 2001, 2002 and 2019), Morin (2000, 2007 and 2011), Pinto (1982, 2007) and Santaella (2014). The methodology approached in this study consists of carrying out an investigation based on bibliographic and documentary analysis, with a literature review of articles and books, weaving thoughts related to the themes that cover digital technologies, education, and the pandemic, discussing emergency remote education in Higher Education in the State of Goiás through the selection and analysis of information from different types of texts that contributed to the theoretical foundation in order to contemplate the objectives of this research. The hypothesis surrounding university digital culture was contextualized, providing elements for a critical reflection on the content presented.

In different cultural and social contexts, technology tends to be used in a fragmented and linear way. Therefore, this study is justified by the idea that science is represented as rational and technological knowledge. The first meaning can be explained as the epistemology of the different techniques aggregated to improve human skills in the use of technology. As a result, "every technique

2 Free translation from the original, "se pretendemos elucidar o conceito de aprendizagem cremos não haver ninguém que objetive ou ponha em dúvida tratar-se de um processo que só pode ocorrer num contexto social" (Pinto, 2007, p. 587).

comes down to responding to a demand from society" (Pinto, 2007, p. 19[3]), and technology brings together the strategies necessary for the evolutionary process of human beings, so man needs to master technology, which has become an indispensable tool.

DIGITAL INFORMATION AND COMMUNICATION TECHNOLOGIES AND HIGHER EDUCATION

The university contributes to broadening the development of students' skills, awakening in them a capacity for decision-making, aiming to make them creative and critical individuals simultaneously within an environment and processes that cohere dynamically, enabling the human development of the individual in their social context. Undergraduate educators can instruct their students with a focus on the use of technologies to contribute and awaken new curiosities and new teachings for personal, social, and academic development.

Education is not reduced to technology but cannot be done without it. Using computers in education, rather than reducing them, can expand our children's critical and creative capacity. Depending on who uses it, in whose favor, and for what. The concrete man must be equipped with the resources of science and technology to fight for the cause of his humanization and liberation (Freire, 2001, p. 98[4])

Pinto (2007) considers that with the advancement of DICTs, technical progress is generated, permeating, and contributing to the development of sociocultural and educational aspects embedded in human formation. This formation is inherent to the human being, who can reflect on the environment

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3 Free translation from the original, "toda técnica resume-se em responder a uma exigência da sociedade" (Pinto, 2007, p. 19).

4 Free translation from the original, A educação não se reduz à técnica, mas não se faz educação sem ela. Utilizar computadores na educação, em lugar de reduzir, pode expandir a capacidade crítica e criativa de nossos meninos e meninas. Dependendo de quem o usa, a favor de quem e para quê. O homem concreto deve se instrumentar com o recurso da ciência e da tecnologia para melhor lutar pela causa de sua humanização e de sua libertação. (Freire, 2001, p. 98).

in which they are inserted in different dimensions, considering their thoughts and feelings, along with their cognitive and behavioral skills, making new learning practices possible. It is essential to emphasize the importance of social interactions to build critical thinking with the contributions and collaborations of everyone in the educational environment.

When we assign the teacher a part of the duty to help students discover their new skills, we suggest a teacher capable of teaching far beyond reading, writing, or interpreting a book. The teacher must go beyond the limits of knowledge, awakening the student's capacity for multiplicity. Collective and individual practices must consider the historicity of each person, who is unique in any place. Their experiences and contact with everyday realities add up to different types of ecosystem variables they have come into contact with throughout their lives. Inquiries and clarifications come with the baggage of interpretation and understanding through meanings created from perceptions and connections with the learning environment mediated by technologies and teaching staff.

In this sense, on the one hand, as Cani and Coscarelli (2016, p. 22[5]) suggest, "[...] it is necessary to rethink teaching and learning due to the presence of new students who, in turn, require new teachers". On the other hand, using new technologies comes at a price, and access to all these tools, digital content, and the various resources and applications that new technologies offer proves to be challenging. Moran stresses the need for teachers to be prepared for the speed at which technology is evolving.

> The more technology advances, the more critical it becomes to have intellectually and emotionally mature educators, curious, enthusiastic, and open, people who know how to motivate and engage in dialog. People who are worth coming into contact with because we come out of it enriched (Moran, 2005, p. 12[6]).

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5 Free translation from the original, "[...] é preciso repensar o ensino e a aprendizagem em virtude da presença de novos alunos que, por sua vez, exigem novos professores" (Cani; Coscarelli, 201, p. 22).

6 Translated from the original, quanto mais avança a tecnologia, mais se torna importante termos educadores maduros intelectual e emocionalmente, pessoas curiosas, entusiasmadas,

Teachers can complement their pedagogical practice by using technology to explore texts, prepare activities, or conduct assessments using technological resources. Pinto's (2007) ideas are related to the humanization of collective work, with freedom understood as liberating material acts contributing to social relations. By facilitating work, it is possible to open up to cultural production with the acquisition of knowledge involving the capacity for imagination and material rationality,

> Technique, correctly interpreted, is identified with the power to perform as many liberating acts as possible, as even vulgar sociology perceives, which nevertheless understands its role in liberating man from manual labor and now, to an increasing extent, from mental labor. (Pinto, 2007, p. 751[7])

By using digital techniques and technologies, it is possible to encourage the development of lessons using digital tools and environments. These lessons consider the criteria for selecting material with content and producing texts and activities that allow for practices and events geared towards a society constantly undergoing a cultural and technological transformation. We are supported by the official documents themselves and Rojo's studies when they state that texts:

> [...] whether printed, digital, or analog (if they still exist), images and layout permeate and make contemporary texts meaningful — almost as much or more than the writing or the letter. Moreover, this is not new. It has been called the multimodality or multisemiosis of contemporary texts [...] (Rojo, 2012, p. 19[8])

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abertas, que saibam motivar e dialogar. Pessoas com as quais valha a pena entrar em contato, porque dele saímos enriquecidos (Moran, 2005, p. 12).

7 Free translation from the original, A técnica corretamente interpretada, identifica-se com o poder de executar o máximo de possíveis atos libertadores conforme percebe até mesmo a sociologia vulgar, que apesar de tudo compreende o papel dela na libertação do homem do trabalho manual e agora em crescente medida do trabalho mental. (Pinto, 2007, p. 751)

8 Free translation from the original, [...] sejam impressos, digitais ou analógicos (se é que ainda existem), as imagens e o arranjo de diagramação impregnam e fazem significar os textos contemporâneos — quase tanto ou mais que os escritos ou a letra. E isso não

Contemporary society is constantly changing; the relationship between words and images or with resources such as sounds, links, graphic arts, drawings, and photos demands different ways of reading because "everything depends on the purpose given to the information by the consciousness of those who receive it." (Pinto, 200, p. 439[9]). In this sense, Rojo (2012) adds that these elements are present in signs, billboards, pamphlets, and newspapers with photos, hypertexts, emoticons, and other elements linked to our daily lives. For the author, these genres highlight the need to re-discuss teacher training and development issues in all teaching modalities, focusing on higher education. Since the texts that circulate socially are diverse, we find the modalities of verbal language (oral and written) and non-verbal and explore the multi-skills of the students inserted in this context of society.

Santaella (2021) states that human language is undergoing anthropological and historical transformation. Until the 20th century, language followed a hegemonic pattern, but since the 1990s, we have increasingly entered the digital universe. The author states that "the confluence into the digital world of a great deal of data relating to key socio-economic and technological issues is generating a gigantic stream of data every day." (2014, p. 26[10]). In this sense, the media have explored image and language, changing the book culture that persisted. Even though multimodality is present in journalism, radio, television news, television advertising, or print, it is hypermedia, in the changes it has made to hypertext, that has decisively replaced the throne of languages in the digital universe.

Kenski says that everything we use in our daily lives is technology. Human social evolution has influenced the development of technologies and will

é de hoje. É o que tem sido chamado de multimodalidade ou multissemiose dos textos contemporâneos [...]. (Rojo, 2012, p. 19)

9 Free translation from the original, "tudo depende da finalidade dada à informação pela consciência de quem a recebe." (Pinto, 200, p. 439).

10 Free translation from the original, "a confluência para o mundo digital de muitos dados relativos à assuntos-chave socioeconômicos e tecnológicos vêm gerando uma gigantesca corrente de dados todos os dias." (Santaella, 2014, p. 26).

continue to do so. As a result, how people interact with technology will change over time, both on an individual and social level. This is because some technologies become "naturalized" over time and lose their status as innovations.

> Technological evolution is not just about new uses for specific equipment and products. It changes behavior. The expansion and trivialization of using a particular technology impose itself on the existing culture and transform not only individual behavior but that of the entire social group. (Kenski, 2012, p. 21[11])

We can consider that Pinto (2007, p. 453) supports Kenski's thinking when he writes that "man is constituted as such throughout the same evolution in which he develops the ability to communicate with his peers within the social group during the work of searching for and producing the means of subsistence."[12] We know that the use of technologies in teaching has its advantages due to the access to digital content, various tools, and the most varied resources that technologies provide, but learning with so many technological approaches is a challenging task.

Complexity has arrived in the educational system through interdisciplinary relations and presents the educational environment with cultural diversity, behaviors, visions, values, and ideas. The change in society is noticeable, and education participates in this reality when we talk about technology because this change in the educational context happens to the extent that:

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11 Free translation from the original, A evolução tecnológica não se restringe apenas aos novos usos de determinados equipamentos e produtos. Ela altera comportamentos. A ampliação e a banalização do uso de determinada tecnologia impõem-se à cultura existente e transformam não apenas o comportamento individual, mas o de todo o grupo social. (Kenski, 2012, p. 21)

12 Free translation from the original, "o homem se constitui como tal ao longo da mesma evolução em que desenvolve a capacidade de comunicar-se com os semelhantes no seio do grupo social durante o trabalho de procura e produção dos meios de subsistência." (Pinto, 2007, p. 453)

> The development of communications, especially in recent years, with the fax, the cell phone, the Internet, and instant communication in all parts of the planet, is a remarkable phenomenon in the sense that it can have very positive effects, allowing us to communicate, understand, and exchange information. (Moran, 2007, p. 42[13])

In this context, Pinto's (2007, p. 454) thoughts make sense of Moran's statement that "man makes himself in his development as a social being through the information he sends out and the information he receives, but in order to do so, there must first be something to inform about."[14] From this perspective, Kenski highlights the use of technologies in the educational sphere in contemporary society in this interrelation of circumstances because

> It opens up opportunities to enrich the learning environment and presents itself as a way of thinking and seeing the world, using a new sensibility through the electronic image, which involves dynamic thinking, where time, speed, and movement become the new allies in the learning process, allowing educators and students to develop their thinking, logically and critically, their creativity through the awakening of curiosity, expanding the capacity for observation, relationships with work groups in the development of projects, a sense of responsibility and co-participation, attitudes that should be projected from an early age, including in the school environment. (Kenski, 2007, p. 45[15])

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13 Free translation from the original, O desenvolvimento das comunicações, sobretudo nos últimos anos, com o fax, o telefone celular, a internet, a comunicação instantânea em todos os pontos do planeta, é um fenômeno notável no sentido que pode ter efeitos muito positivos, que permitam comunicar, entender e intercambiar informações. (Moran, 2007, p. 42).

14 Free translation from the original, "o homem se faz a si mesmo em seu desenvolvimento como ser social pela informação emitida e pela recebida, mas para tanto necessariamente tem de haver primeiro o que informar." (Pinto, 2007, p. 454)

15 Free translation from the original, Abre oportunidades que permitem enriquecer o ambiente de aprendizagem e apresenta-se como um meio de pensar e ver o mundo, utilizando-se de uma nova sensibilidade, através da imagem eletrônica, que envolve um pensar dinâmico, onde tempo, velocidade e movimento passam a ser os novos aliados no processo de aprendizagem, permitindo a educadores e educandos desenvolver seu pensamento, de forma lógica e crítica, sua criatividade por intermédio do despertar da curiosidade, ampliando a capacidade

Teaching and learning must be represented beyond the walls of the university because learning does not mean accommodation or a constant cultural situation, but the opposite, since the transcendence of knowledge evolves by breaking with traditional and cultural paradigms of teaching in order to offer new educational perspectives with the use of digital technologies mediated by the innovation of educational practices, enabling the individual to deconstruct concepts around their collective and individual reality with "the acquisition of instruments for non-adaptation to the current state, thanks to the transformation of this into a new situation, representative of greater progress." (Pinto, 2007, p. 596[16]). Since access to new technologies goes beyond the use of a computer, as access to a telephone with numerous technologies is present in people's daily lives, the use of technologies is essential in the educational environment to achieve the process of innovative education, as Kenski (2007, p. 33) points out:

> The power of digital language, based on access to countless digital media using cell phones, computers, and all their peripherals, to the internet [...] with all the possibilities of these media increasingly influence the constitution of knowledge, values, and attitudes creating a new culture and another informational reality in all spaces of society. (Kenski, 2007, p. 33[17])

Investing in teacher development is important because "in the permanent training of teachers, the fundamental moment is that of critical reflection on

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de observação de relacionamento com grupos de trabalho na elaboração de projetos, senso de responsabilidade e coparticipação, atitudes essas que devem ser projetadas desde cedo, inclusive no espaço escolar. (Kenski, 2007, p.45)

16 Free translation from the original, "a aquisição de instrumentos para a não-adaptação ao estado atual, graças à transformação deste em nova situação, representativa de maior progresso." (Pinto, 2007, p. 596)

17 Free translation from the original, O poder da linguagem digital, baseado no acesso a inúmeras mídias digitais utilizando de celulares, computadores e todos os seus periféricos, à internet [...] com todas as possibilidades dessas mídias influenciam cada vez mais a constituição de conhecimentos, valores e atitudes criando uma nova cultura e uma outra realidade informacional em todos os espaços da sociedade. (Kenski, 2007, p. 33)

practice. It is in thinking critically about today or yesterday that we can improve the next practice" (Freire, 1996, p. 44[18]). In this conception, the university has historically been a place for professional training and the production of knowledge, providing opportunities for these to result in cultural, social, economic, and intellectual benefits inherent to society and "in the case of the digital medium, the reader is invited to open, read and manipulate texts through an interchange with the electronic space allowed by the computer as an eminently interactive medium." (Santaella, 2014, p. 122[19]).

Freire (1996) corroborates this, adding that teaching is not about transmitting knowledge but about creating new learning possibilities and constructing new knowledge. In this perception, the educator must reflect critically on teaching, knowing that theory and practice must be fundamental to the being in transformation.

In this way, educational practice implies the existence of subjects in developing scientific knowledge, where one instructs and learns, and the other, who is learning, also learns and teaches. Freire dialogues with this perspective in scientific education:

> [...] On the other hand, it is necessary to insist on not thinking that educational practice lived with affection and joy does not require serious scientific training and political clarity on the part of educators. Educational practice is all of these things: affection, joy, scientific ability, technical mastery at the service of change, or, unfortunately, the permanence of today. (Freire, 2019, p. 53[20])

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18 Free translation from the original, "na formação permanente dos professores, o momento fundamental é o da reflexão crítica sobre a prática. É na prática do pensar criticamente de hoje ou de ontem que podemos melhorar a próxima prática" (Freire, 1996, p. 44).

19 Free translation from the original, "no caso do meio digital, o leitor é convidado a abrir, ler e manipular textos por meio de um intercurso com o espaço eletrônico permitido pelo computador como mídia eminentemente interativa." (Santaella, 2014, p. 122).

20 Free translation from the original, [...] é preciso, por outro lado, reinsistir em que não se pense que a prática educativa vivida com afetividade e alegria, prescinda da formação científica séria e da clareza política dos educadores ou educadoras. A prática educativa é

In 2011, Morin argued that, in the future, education should be concerned with the adequacy and adaptation of knowledge. However, in the context of knowledge, Pinto considers that "The technology of the future is a technical fact. The future of technology is a social fact." (2007, p. 694[21]). This education of the future has mechanisms and applications for quality teaching with the renewal of the new formation of society. However, to accompany and interact with this modern education, teachers need to be trained and organize context-oriented, global, multidimensional/transdisciplinary, and complex teaching, with a view to logical thinking and the articulation and organization of world knowledge.

According to Freire (2002), we need to analyze and be attentive to knowledge, realizing that each group of students has a unique characteristic that must be considered in educational activities. Pinto consolidates Freire's ideas on knowledge:

> Knowledge is the set of cultural data that has become socially conscious and that society can express through language. In illiterate societies, there is no knowledge graphically preserved in writing, yet there is transmission of knowledge through social practice, orally, and therefore, there is education. (Pinto, 1982, p. 31[22])

Likewise, working with adults requires developing an attentive eye to the practices carried out with this group to determine and promote learning or massify it with activities that are disconnected from the context of these learners.

The education of the future, through teaching that focuses on human knowledge as part of the universe makes it possible to promote a hopeful and favorable climate for human development in society. Morin (2011) argues that

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tudo isso: afetividade, alegria, capacidade científica, domínio técnico a serviço da mudança ou, lamentavelmente, da permanência do hoje (Freire, 2019, p. 53)

21 Free translation from the original, "A tecnologia do futuro é um fato técnico. O futuro da tecnologia é um fato social." (2007, p. 694).

22 Free translation from the original, O saber é o conjunto dos dados da cultura que se têm tornado socialmente conscientes e que a sociedade é capaz de expressar pela linguagem. Nas sociedades iletradas não existe saber graficamente conservado pela escrita e, contudo, há transmissão do saber pela prática social, pela via oral e, portanto, há educação. (Pinto, 1982, p. 31)

human beings should be considered an intrinsic constituent of society. Thus, knowledge plurality and disciplines permeate the training of professionals and teachers, intending to train critical professionals capable of constructing and reconstructing reflections to develop and improve pedagogical practices since "the critical educator must make the student understand that he is being educated in the same way that he (the educator) has educated himself." (Pinto, 1982, p. 117[23]).

Morin (2011) points out that all knowledge must be contextualized to be relevant, developing the natural capacity of the human being so that all information in context is learned. In his timeless speech, Pinto (1982, p. 118) considers the importance of exchanging knowledge and states, "In the process of education, there is no essential inequality between two beings, but a friendly encounter whereby one and the other educate each other reciprocally."[24]

To this end, education teaches the human condition by considering reason without forgetting affectivity within emotion, teaching the whole without fragmenting the disciplines so that the knowledge taught is not lost in the context of the whole. In this way, interdisciplinarity is adopted for diversified knowledge using apps. Santaella (2014, p. 33) explains that "the touchscreen will be mandatory for smartphones, and social networking apps will always be present."[25] Therefore, digital communication is a reality in the educational space, where the convergence of physical media is transported to digital environments, accessible through smartphones and other computer equipment with internet access.

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23 Free translation from the original, "o educador crítico deverá dar a compreender ao aluno (sic) que se está educando da mesma maneira que ele (o educador) se educou." (Pinto, 1982, p. 117).

24 Free translation from the original, "no processo de educação não há uma desigualdade essencial entre dois seres, mas um encontro amistoso pelo qual um e outro se educam reciprocamente." (Pinto, 1982, p. 118)

25 "a tela sensível ao toque será um item obrigatório para os smartphones e os aplicativos de rede social sempre estarão presentes" (Santaella, 2014, p. 33)

As teaching requires critical reflection on educational practice, it implies a continuous exercise of what one says about one's actions and an examination of the coherence between discourse and practice. This is because only by critically examining one's past practice can future practice be improved (Freire, 2019).

Morin (2011) presented an approach that requires tackling the complex problems of those who "are ignored or forgotten" due to educators' difficulties in transmitting knowledge to a society with a social structure of different classes and in constant transformation. For the author, the new knowledge that modern society has incorporated and the contributions that this new knowledge will make to future education is a challenge for educators. In his studies, the sociologist has shown that contemporary society has ways of articulating within the model, plus the educational universe with humanized training, enabling an approach with electronic devices to assist in the teaching-learning process, adding modern and up-to-date knowledge to the context of this new century.

For Santaella (2021, p. 88), "what seems necessary is to understand that we are facing a profound transformation in the ways information is produced, received and reproduced."[26] New needs emerge as new transformations arise, whether in the technological, social, political, or educational context, and are articulated with the countless changes, uncertainties, new technologies, and, above all when observing and analyzing the model of education that prevailed in the 21st century.

In this sense, Morin (2011) encourages some reflections on the existing gaps, known as "holes." These gaps would lead to new demands for 21st-century education and should be placed at the center of concerns in training students that the educational institution grants to society. The author points out that the education of the future must face up to the two necessary foundations of error and illusion, highlighting the blindness with which education leads to knowledge. According to the writer, knowledge is threatened by error and

26 Free translation from the original, "o que parece ser necessário é compreender que estamos diante de uma transformação profunda nos modos como as informações são produzidas, recebidas e reproduzidas" (Santaella, 2021, p. 88)

illusion, and education helps to show which direction to take. Because of educational and technological innovations, it can be deduced that there are no guarantees of learning when there is communication noise between educators and learners in message exchanges. Consequently, communication strategies can be adopted to clarify ideas through educational dialogues, consider the construction of continuous interlocutions for projections of future knowledge, and consider and mitigate risks in establishing socialization.

Morin (2011) points out that the complexity of the human condition goes beyond technical and specific knowledge when we think about the development of critical and holistic thinking in human education. Affective and emotional dimensions must be considered to establish connections between the individuals who make up the academic community. In this way, it can be considered that reason is a crucial element for understanding the environment in which one lives, where there are social contacts in communication relationships with different types of subjects and cultures, relating collective and individual experiences and experiences in the aggregation of values and concepts in the process of deconstructing and constructing information to be absorbed, considering the limitations of individually differentiated perceptions. In this sense, much knowledge is essential for teachers, such as understanding the inclusion of being, because, as human beings, we are constantly evolving and renewing our personal and professional trajectories (Freire, 2019).

Teaching mediated by technologies in the classroom requires knowledge capable of presenting global and fundamental problems so that knowledge can be inserted partially and locally. From this perspective, the principles of Relevant Knowledge deal with essential information about the world, which must be contextualized with knowledge of the world as a world. The university will use technology in the classroom or outside to provide access to information for all citizens, allow all professors and students the opportunity to learn and teach in real-time, and integrate knowledge through communication and information with the use of technologies.

> Learning how to read and write or how to handle a plow or use fertilizer (as well as learning the ideas of a program of action)

> — in short, all learning must be closely associated with becoming aware of the actual situation experienced by the learner. (Freire, 1979, p. 05[27])

The university can contribute to broadening students' development, awakening a capacity for decision-making, and simultaneously making them creative and critical individuals. Undergraduate professors can instruct their students with a focus on the use of technologies to contribute and awaken new curiosities and new teachings for personal, social, and academic development. As a result, it is essential to note that DICTs were used during the pandemic period to prepare and present content to the university community through social digital platforms addressing different topics inherent to the pandemic period. Higher education institutions began to use technological resources to continue the transmission of teaching to the university community, fulfilling academic activities that converged to the digital environment. In this sense, DICTs have come to be seen as tools allied to remote teaching because physical social distancing was once mandatory for everyone. Amid the health crisis, professors and students communicated via social digital platforms and shared emotions and feelings within these environments. The new teaching modality was worrying because of the disparities in internet connectivity, involving different elements related to digital inclusion. More details on emergency remote teaching will be covered in greater depth in the next section.

EMERGENCY REMOTE EDUCATION IN GOIÁS

During the period of Emergency Remote Education (ERE), we came up against the process of socialization when, historically, people discovered that it is possible to teach with technology. Technology in education aims to change how teachers work and is not limited to a simple form of technological use.

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27 Free translation from the original, O aprendizado das técnicas de ler e escrever ou o das técnicas de manejar o arado ou usar fertilizantes (bem como o aprendizado das idéias de um programa de ação), — enfim, todo aprendizado deve encontrar-se intimamente associado à tomada de consciência da situação real vivida pelo educando. (Freire, 1979, p. 05)

The teacher ceases to be a transmitter of knowledge and becomes a facilitator of this knowledge, making their lessons more attractive, dynamic, and different to cater to the new generation, which is more connected to the technological scene. Kenski (2007, p. 43) states that:

> Technology and education are inseparable concepts. For this integration to occur, the group's knowledge, values, habits, attitudes, and behaviors must be taught and learned. In other words, education must be used to teach about the technologies that underpin the group's identity and actions, and they must be used to teach the foundations of education. (Kenski, 2007, p. 43[28])

Knowledge of technology for teachers and students is a mechanism for classroom and community interaction. Morin (2011) emphasizes the need to know the context of humanity to show that all parts of the world have experienced something tragic, pointing out the oppressions and domination that devastated humanity that still exist in contemporary society. Therefore, the consequences of the complex planetary crisis that has taken hold in the 21st century, due to the ideology aimed at political and economic power, causing significant physical and mental suffering in society, and that is why teaching action must be mediated by the use of digital technologies to seek the engagement of students with convergent and collaborative digital environments in the search for social and participatory insertion in the production of mutual teacher-teacher, student-teacher learning. In this context, the lack of a logical explanation for these facts challenges education to find a way of teaching with coherence and the ethics of understanding.

When mentioning the countless uncertainties over the centuries, Morin (2021) adds the period of the Covid-19 pandemic with emergency remote

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28 Free translation from the original, Tecnologia e educação são conceitos indissociáveis. Para que ocorra essa integração, é preciso que conhecimentos, valores, hábitos, atitudes e comportamentos do grupo sejam ensinados e aprendidos, ou seja, que se utilize a educação para ensinar sobre as tecnologias que estão na base da identidade e da ação do grupo e que se faça uso delas para ensinar as bases da educação. (Kenski, 2007, p. 43)

teaching, in which universities suspended face-to-face activities as a form of prevention against the spread of the virus, a process of classes with technological resources begins.

However, given the emergencies of the pandemic context and to not jeopardize the educational process, classes were prepared for unforeseen events and uncertainties, in a way to plan and develop online classes flexibly to ensure that the information and knowledge acquired over time are taught based on the veracity of the facts presented.

Classes in the ERE were fundamental to fulfilling the academic calendar at a time when professors had to break down obstacles and modify or expand their knowledge of convergent digital technologies and required a reorganization of planning and restructuring of the curriculum due to the atypical situation and the need to organize teaching strategies using technology-mediated platforms to meet the demands of professors and students.

With the health crisis caused by the Covid-19 virus, a series of interventions were needed to reduce the transmission of the virus and slow down the evolution of the pandemic. Thus, progressive social isolation measures were used, such as a ban on events and gatherings in public and private places, closures of schools and universities, the use of face masks and hand hygiene, raising awareness among the population to leave their homes in cases of extreme need, such as to buy medicines, food or to go to work (Aquino, 2019). Faced with this context experienced by teachers and students, Moreira and Schlemmer (2020, p. 8-9) explain that:

> The term remote means distant in space and refers to a geographical distance. Remote Teaching or Remote Classroom is, therefore, a teaching modality or classroom that presupposes the geographical distance between teachers and students and has been adopted at different levels of education by educational institutions around the world due to the restrictions imposed by Covid-19, which makes it impossible for students and teachers to be physically present in the geographical spaces of educational institutions. This modality transposes physical face-to-face teaching (the same courses, curriculum, methodologies, and pedagogical practices)

> to digital, networked media. The process is centered on the same teacher's content as in the physical classroom. Although there is a geographical distance, sharing the same time is privileged, i.e., the class takes place in synchronous time, following the principles of face-to-face teaching.[29]

Due to the seriousness of the Covid-19 pandemic, on March 18, 2020, Ordinance No. 343, approved on March 17, 2020, by the Ministry of Education (MEC), was published in the Federal Official Gazette. This document authorized the replacement of classes in face-to-face higher education courses with remote classes during the Covid-19 pandemic. The Ordinance grants institutions the availability of digital platforms for students to monitor their subjects and authorizes the suspension of classes with subsequent replacement if universities make this choice (Brasil, 2020). Given the above, universities and their teaching staff should structure themselves best to deal with education during the Covid-19 pandemic. The ERE presented several challenges for both professors and students who had to use digital platforms.

Professors had to adapt to the digital environment; some had experience with digital tools and environments, and others did not. It was necessary to create digital content to be made available to students on digital platforms, causing work overload for many professors who started working on educational activities within the family due to measures restricting the movement of people during the pandemic. Another factor to be highlighted was the

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29 Free translation from the original, O termo remoto significa distante no espaço e se refere a um distanciamento geográfico. O Ensino Remoto ou Aula Remota se configura então, como uma modalidade de ensino ou aula que pressupõe o distanciamento geográfico de professores e estudantes e vem sendo adotada nos diferentes níveis de ensino, por instituições educacionais no mundo todo, em função das restrições impostas pelo Covid-19, que impossibilita a presença física de estudantes e professores nos espaços geográficos das instituições educacionais. Nessa modalidade, o ensino presencial físico (mesmos cursos, currículo, metodologias e práticas pedagógicas) é transposto para os meios digitais, em rede. O processo é centrado no conteúdo, que é ministrado pelo mesmo professor da aula presencial física. Embora haja um distanciamento geográfico, privilegia-se o compartilhamento de um mesmo tempo, ou seja, a aula ocorre num tempo síncrono, seguindo princípios do ensino presencial. (MOREIRA; SCHLEMMER, 2020, p. 8-9)

search for student engagement to promote educational dialogues that dealt with curricular themes. As a result, interactions with the students had to be improved to assess their participation in the formative moments. The professor was also at the mercy of communicating with the students due to the limitations of the internet connection and restrictions on computer equipment because not all the students had the socio-economic conditions to purchase equipment and services.

The students experienced moments when the lack of social interaction led to isolation among their peers and professors, leading to different feelings and emotions related to physical and social distancing. Another relevant factor in the students' adaptation was time management in academic activities due to the changes in routines previously experienced in face-to-face collective spaces that began to be developed in the family environment, requiring self-control to carry out activities promptly. It is well known that not all the students had computer equipment, let alone access to the internet. In this sense, some students could not participate in moments of digital educational socialization, which compromised the learning process.

In the state of Goiás, Decree No. 9,633 was published, which, in short, placed Goiás in a state of public health emergency, suspending activities in businesses, schools, churches, and hospitals. So, given the continuity of academic activities due to the interruption of face-to-face classes, the State Government of Goiás published CEE Resolution No. 02/2020, which is already explicitly a character of new teaching regulation, thus shaping what would be Emergency Remote Education (ERE). The decree initially had a fifteen-day suspension of activities, circular No. 75/2020, and could be suspended for longer or not, depending on the spread of the Covid-19 virus. However, it was decided to switch to the ERE to avoid further damage, as the actual return to face-to-face classes was only on October 18, 2022.

Teaching with technologies and digital platforms to improve knowledge has become necessary, and improving new techniques and skills can contribute to the teaching and learning process. In this context, the teacher and the school

are clear that teaching results in a political action to achieve the objectives of an education based on the principles of quality, equity, and equality. Therefore:

> [...] education must be — in its content, its programs, and its methods — adapted to the end that is pursued: to allow man to become a subject, to build himself as a person, to transform the world, to establish relationships of reciprocity with other men, to make culture and history. (Freire, 1979, p. 39[30])

Morin (2011) adds that, in the face of advancing technologies, knowledge and the advancement of history arise from events resulting from technological innovations or internal or local creations and are treated as deviations from normality. The author deals with the problem of understanding, as a planetary condition of the difficulty of human beings not knowing the planet since society is made up of different origins, ideological, economic, social, and others, and they are complex and interconnected in society.

In this way, ERE was incorporated during the Covid-19 pandemic as a health protection and virus contamination control strategy. In this perspective, Freire (2019, p. 45) presents some attitudes that teachers should assume, such as being humanistic, revolutionary, and dialogical, that is, a problematizing educator who constantly redoes their act of knowledge in a dialogical relationship of knowledge construction with students.

Morin (2011) emphasizes the widespread lack of understanding among people of the many modern means of communication and how to deal with so many technological devices. In the field of education, technology has enabled students to take part in Meet classes, conduct research on the Internet, and communicate with each other via video calls. However, education must be

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30 Free translation from the original, [...] é preciso que a educação esteja — em seu conteúdo, em seus programas e em seus métodos — adaptada ao fim que se persegue: permitir ao homem chegar a ser sujeito, construir-se como pessoa, transformar o mundo, estabelecer com os outros homens relações de reciprocidade, fazer a cultura e a história. (Freire, 1979, p. 39)

centered on the process of a globalized society, coexisting with technologies, but without forgetting the human condition.

Morin (2011) stresses the need for all teachers to know the seven knowledge, not to modify educational programs, but to interact with disciplines in a uniform and non-fragmented way, seeking to integrate studies since knowledge is a science of knowing and learning new knowledge or improving that already taught. Faced with this new scenario presented by the pandemic, as Gonçalves and Avelino point out:

> [...] Human relations have changed quickly, especially in the first semester of 2020, as new challenges have arisen in everyday life. On the other hand, they have opened up other possibilities for pedagogical work and digital platforms for methodological innovations that were rarely used before. (Gonçalves; AVELINO, 2020, p. 42[31])

Under these conditions, higher education with the use of technologies enables interaction between individuals and society, providing scenarios favorable to developing a liberating critical conscience in understanding and constructing knowledge based on innovative actions intertwined with human development. As such, the weaving of education and technology provides educators and students with support for progressive human development, laying the foundations for the future of teaching and learning in educational institutions. So, in this context, thoughts about liberating education tend to lead us to believe that digital educational and social relations in the university academic community will possibly make it possible to promote learning by addressing critical thinking concerning the construction of knowledge. Consequently, teaching and learning practices mediated by digital technologies allow the convergence of teaching to be explored to develop human relationships.

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31 Free translation from the original, [...] as relações humanas foram alteradas em pouco tempo, principalmente no primeiro semestre de 2020, pois novos desafios surgiram no cotidiano. Por outro lado, abriram outras possibilidades de trabalhos pedagógicos, plataformas digitais de inovações metodológicas pouco utilizadas anteriormente. (Gonçalves; Avelino, 2020, p. 42)

Thus, according to Freire (2019), the educational practice he proposes "[...] must be, in itself, a rigorous testimony of decency and purity. A permanent criticism of the easy detours with which we are tempted, sometimes or almost always, to leave the difficulties that the true paths can pose" (Freire, 2019, p. 34[32]). Given the educational scenario with the ERE, analyzing how professors have faced this complex situation, both in terms of teaching and the difficulty of meeting the demand for online classes, requires a review of their knowledge and actions, as well as their working conditions, adequate training and the support they need from this moment on due to the Covid-19 pandemic, which has undoubtedly had an impact on their teaching practices and their lives.

CONSIDERATIONS

Contemporary education enables new learning practices mediated by digital information and communication technologies. As we have seen, higher education professionals have had several challenges when using digital techniques and technologies during the period of Emergency Remote Teaching during the Covid 19 pandemic. In this sense, it is worth pointing out that it is necessary to "develop integrative strategies to enter the game of complementarities with which current media present us is the great challenge of educational and curricular systems in the contemporary world." (Santaella, 2014, p. 189[33]).

The discussion justified the importance and modification of the confluence of face-to-face classes to the digital environment in Emergency Remote Education in higher education from different social and cultural perspectives. The works mentioned in this article contributed to the writing process, intending

32 Free translation from the original, "[...] tem de ser, em si, um testemunho rigoroso de decência e de pureza. Uma crítica permanente aos desvios fáceis com que somos tentados, às vezes ou quase sempre, a deixar as dificuldades que os caminhos verdadeiros podem nos colocar" (Freire, 2019, p. 34).

33 Free translation from the original, "desenvolver estratégias integradoras para entrar no jogo das complementaridades com que as mídias atuais nos presenteiam constitui o grande desafio dos sistemas educacionais e curriculares no mundo contemporâneo." (Santaella, 2014, p. 189).

to understand theoretical concepts to support the theme's contextualization, bringing essential aspects of digital information and communication technologies into education. Teaching and learning processes are converging in the digital world with the exchange of knowledge, going beyond the old traditional practices of education in higher education and that "the educator must understand that the source of his learning, of his training, is always society" (Pinto, 1989, p. 109[34]).

With this dynamic of digital resources, it was possible to note the importance of social interactions during the ERE. Despite the complexity of the challenges of educating in the digital environment, we noticed that the acts of teaching and learning linked to digital technologies required pedagogical reorganization and content planning converged to the digital environment.

The ERE was an experience that challenged professors to connect knowledge and transform education to meet the demands of providing an integral formation of the individual as a subject for critical participation in society.

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CAPÍTULO 3

The information and its sharing

Validation of a theoretical model in an organizational context

Rita de Cássia Martins de Oliveira Ventura
Armando Manuel Barreiros Malheiro da Silva
Mônica Erichsen Nassif

When proposing to study organizations, it is essential to remember that changes in the model of work organization, and also in the tasks that employees need to perform have occurred. Lúcio (2018, p. 1) states that in Brazil, the main vectors that created a "new work world" are focused on "accelerated and extensive technological innovation in all sectors," on outsourcing, on flexibility in work relations, on multifunctionality of employees, on reduction of job posts, which, consequently, leads to fierce competition among workers for scarce job opportunities. In addition to these aspects, Motta and Vasconcelos (2002), based on Max Weber, affirm that there is uncertainty in relation to the behavior of people when inserted into these organizational structures. While a cooperative behavior is expected, in many scenarios, it is still perceived an alignment with the Weberian Protestant Ethics where individualism prevails as a way of acting in these spaces. The cited authors point that the organizational subjects, defined as Organizational Man by the Structuralist Approach, "are beings

who act rationally aiming to achieve their objectives" (Motta; Vasconcelos, 2002, p. 149).

It is in this perspective that Mintzberg (1995) asserts the necessity of considering the organization as a socio-economic-political system, indicating the macro nature of organizations. In this sense, Silva (2005, p. 29) states that to understand internal aspects (such as social relations, employee behavior, etc.), it is also necessary to focus on understanding processes, i.e., "how things are done" and how the organizational structure, culture, and power relations are designed, how leadership are exercised, and also which management strategy is adopted. And it is in this scenario that organizational subjects, the so-called organizational men, "act by creating maneuvering options within the bounds of rules and structure" (Motta; Vasconcelos, 2002, p. 149), creating an environment which was defined by Morgan (2002) as a political arena. Aware of this reality, organizations, as emphasized by Camargo de Oliveira *et al.* (2018), need to focus on creating an environment that mitigates conflicts and induces behaviors directed towards their established and desired goals. Specifically in this study, an environment that fosters information and knowledge sharing.

The relevance of information and knowledge, as pointed out by Kumar (1997), took place in organizations from the moment when the currency of value with workers shifted from labor to knowledge. In the author's analysis, this shift transformed the way of managing organizations, making then turn to human capital. Therefore, people, based on this assumption, in the organizational scenario, according to Davel and Vergara (2010, p. 3), "constitute the essential principle of its dynamics, giving vitality to activities and processes, innovating, creating, recreating contexts and situations that can make the organization to position itself in a competitive way."

Due to the importance of this theme in the organizational context, various research has been developed both in the search of a proposal for the knowledge management and in relation to necessary variables in the scenario which stimulate the information sharing. However, Wang and Noe (2010), in studies analyzing research results on knowledge sharing, found a lack of understanding regarding how organizational and interpersonal contexts, as well as individual

characteristics, impact knowledge sharing. Their work reveals a concentration of knowledge sharing research on five areas: organizational context, interpersonal and team characteristics, cultural characteristics, individual characteristics, and motivational factors. Overall, the research analyzed by them uses the analysis of influence on the attitude of sharing unilaterally without considering the dynamics existing within organizational limits. In this perspective, it is significant to consider that organizations are environments of social interactions and the pursuit of interests, environments of multiple behaviors caused by numerous factors, and that is why they fertile fields of research. Research that should take into consideration that humans are protagonists in any social context and not submissive beings, content with managerial controls that do not consider their subjectivity. Another study supporting this research is the findings of Ventura (2016), which point that the People Management model is the significant influence point in the availability for sharing, along with the existing trust with whom the sharing takes place, organizational layout, level of interaction with informal groups, and the degree of power of information.

In line with these analyses, Camargo de Oliveira *et al.* (2018, p. 54) argue that "organizations and their organizational subjects are not isolated, in other words, they are part of a context whose interconnections are real." Which means, "in the relationship between an employee and the organization, each party only participates for what it expects to receive in return for its participation" (Thomas Jr., 1997, p. 38). It is included in this analysis the relationship between people and their availability for sharing, as individuals have autonomy to share or not the information they possess, which makes any information management system to lose itself in face of their decision.

Based on these theoretical contributions, the present research proposal is justified by the need to understand the entirety of the organization, that is, consider all set of elements and assess their ability to influence the sharing behavior of their members, taking into consideration the theoretical assumptions from correlated studies, aiming at integrating them. In this path, the theoretical framework for this study is based on the assumptions of the Structuralist School, where the organization is understood as composed of interconnected and related

parts forming a dynamic whole greater than the sum of its parts. This way, the aim is to address the gap left by different studies, obviously without undermining their value, in understanding the influencing elements of a more cooperative behavior towards information sharing. It is also considered the arguments of Loureiro *et al.* (2018, p. 169), who, based on research results, emphasize that the sharing theme, despite the number of studies, is still underexplored, as "there is a tendency to consider the topic in a fragmented way", which in consequence allows for a shallow approach to the factors influencing people's availability for sharing information and knowledge.

Under this perspective, the objective is to understand how the main elements forming the organization, structure-culture-power-strategy, influence and what are their intensities in relation to the organizational subjects' availability for sharing information. Consequently, the goal is to develop and empirically validate a theoretical model capable of explaining the availability of organizational subjects for sharing information based on the organization's forming elements.

To achieve this, the methodological approach adopted for the study is a case study where documentary research and surveys were used to collect data on organizational culture and validate the intended model. The locus of analysis was a meat processing plant in Brazil, more specifically in the state of Minas Gerais, operating in the national and international markets. In general, the data demonstrates the significant involvement of people in information sharing, and that this behavior depends on their willingness and interests. However, one cannot deny the influencing effect that the forming elements of the organization have, acting either as stimulants or inhibitors of employees' availability for sharing. Among these elements, the role of organizational culture stands out, as it has the ability to develop identity and commitment along with the management model (power variable in the model) adopted, which must necessarily incorporate people as a crucial element in organizational development. Thus, the inclusion of people as a structuring element of the organization is relevant and has become significant for analyzing information sharing in organizations, as they are the main responsible for such behavior.

It is expected, therefore, that the provocation inserted in the research agendas of Information Management and organizations will bring significant contributions to the field of Information Science and Organizational Studies

THE ORGANIZATION AND ITS FORMING ELEMENTS

Throughout the existence and development of organizations in our society, starting from the Industrial Revolution, organizations have emerged and expanded, occupying different spaces. In this direction, society has been taken over by a scenario increasingly dependent on organizations, and, of course, the insertion of humans into this context has led to different connections with work activities. Different relationships between humans and work have unfolded until we reach the contemporary society defined by some theorists as "post-industrial, post-Fordist, and post-modern" (Kumar, 1997, p. 9). However, despite being different, these definitions center around the idea of the information society associated with advancing technology, which is consolidating more each day. Bell (1980) explains this evolution using the Industrial Revolutions, where the first two were driven by steam and energy. The third had the computer as its central point, explaining the shift of knowledge and information to become "strategic resources and transformative agents of post-industrial society" (Bell, 1980, p. 531). Characterizing this "new" society, Naisbitt (1984)[1] states that it is produced "mass information, just as cars were mass-produced," making information the driving force that leads to a new "mode of production" (Kumar, 1997).

Regarding technology, Kumar (1997) emphasizes that the information society brings physical isolation, where people walk on the "information superhighway as isolated selves" (p. 168), not creating bonds of social relations but "a segmented and resolutely one-dimensional community" (p. 169). Not that technology is the sole villain in this process, but its use in organizations should be based on a culture of cooperation and sharing. Undoubtedly, technological development has opened up multiple possibilities; however, it also puts "the

1 Cited by Kumar (1997).

power of knowledge at our fingertips, at the touch of a computer keyboard" (Kumar, 1997, p. 170).

As a result, the entire organizational context has changed, now valuing and revolving around information and knowledge, causing what Kumar (1997) describes as a profound shift, changing the origin of value from labor to knowledge. This shift transformed the management of organizations, making them turn also towards human capital, at least as a management proposal, even if in some corporate contexts, this practice is far from being realized.

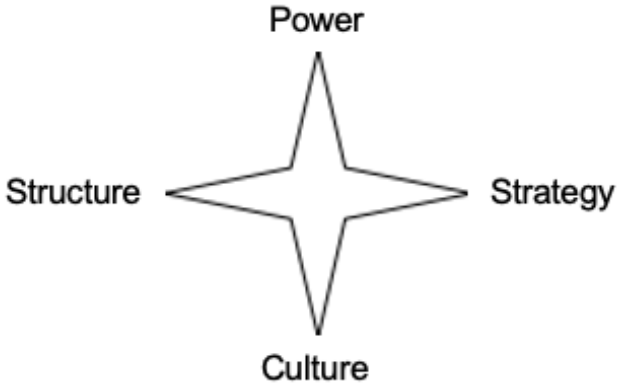
In this process of organizational change, individuals who are part of it use their knowledge and, through the sharing of information, recreate it because, as Camargo de Oliveira *et al.* (2018, p. 59) state, "information is constructed in its life cycle." Defining information sharing, Tomaél (2012, p. 13) points out that it "constitutes in the exchange of information between partners, who produce increased visibility of the chain that supplies the processes in which they are involved." From this perspective, the fundamental point of the sharing process is the people who can be understood as a guiding thread that dimensions and, at the same time, redesigns knowledge. Barreto (2002) had already presented that information, in its "rite of passage," is characterized by its most interesting feature, which is the transcendence from its state of thought (from the sender) to configure itself as knowledge (for the recipient). In the information society scenario, Borelli and Tomaél (2012, p. 72) argue that the act of sharing information "meets the need to improve the development of capabilities" both in the internal and external environment of organizations, in the constant pursuit of innovation and competitive advantage.

Following the paradigms of the Structuralist Approach, organizations are understood as formally instituted institutions composed of various interconnected parts. And, as it could not be otherwise, the result of this interaction is a whole that is greater than the simple sum of its parts because the reciprocity relations established between them must be taken into account (Motta, 1970). In this direction, understanding organizations requires considering that, within the structuralist assumptions, the parts are not static; they are incredibly dynamic,

and the intersection between formal and informal organization makes them alive, mutable, and challenging.

Touching on the informal organization, Blau and Scott (1970, p. 16) state that it consists of social relationships that occur between individuals and groups and has a "system of shared beliefs and orientations that serve as standards for human conduct" as people work and interact. Considering these aspects and the forming points of the formal organization, Mintzberg (1995, p. 17) warns to the fact that "formal and informal structures are intertwined and impossible to distinguish." To understand this internal environment — which involves both the formal and the informal organization — Silva (2005, p. 28) alerts to the need to "have a global view of the business, that is, how things are done, and how the structure, organizational culture, power relations, existing leadership, and management strategy are characterized." Thus, Silva (2005, p. 37) suggests that organizational variables (elements) are "power/leadership, structure, culture, and strategy, with this set being the 'molecular' structure of organizations, thus giving us their physiognomic portrait." According to the cited author, each of these poles will determine the configuration and orientation of the organization. Figure 1 represents Silva's (2005) conception within the logic he calls the "Molecular Structure of Organizations."

Figure 1 — Molecular Structure of organizations



Source: Silva, 2005, p. 35

Silva (2005) explains this structure as follows: the power pole involves the way of managing and how it is configured in the organizational context. The structure pole addresses the type of structural configuration, while the strategy pole encompasses the mission, vision, objectives, actions, and policies established by the organization that will give it direction. The culture pole involves values, patterns, myths, and organizational fears, among others. For this study, the molecular structure established by Silva (2005) will be used as a basis for understanding the organization, aiming to identify the influence of these poles on the organizational subjects' availability for sharing information and knowledge.

INFORMATION SHARING IN THE ORGANIZATIONAL CONTEXT

Davenport (2000) considers information sharing as a spontaneous act, dependent on people's availability for sharing what they know, with interorganizational relationships being the main means (Wang; Chen; Chen; 2008). Tomaél (2012, p. 13) states that "information sharing constitutes itself in the exchange of information among partners, who produce an increase of visibility of the chain that supplies the processes in which they are inserted." Making the centrality of people in the act of sharing evident, Brookes (1980, p. 131) considers the "information as inseparable from the subject," because the "information is a human product, so the individual should not be excluded from the process." Reaffirming these aspects, Ajmal and Koskinen (2007) assert that technology is an extremely useful tool in communicating explicit knowledge; however, the communication of intrinsic knowledge and the creation of new knowledge require social interaction and human participation.

Thinking about information sharing in the organizational context, one must consider the organizational poles pointed out by Silva (2005), which establish the limits of people's actions, propelling, stimulating, or limiting behaviors. Power/leadership, structure, culture, and strategy, in general, have already been related and studied with the theme of information sharing. However, these studies considered these poles individualized, generally ignoring the

interconnection existing between them as pointed out by Silva (2005) and the protagonism of organizational subjects in their operation in the work scenario.

This aspect is important because, as suggested by Wang and Noe (2010), based on research findings, the organizational subjects decide whether to share their knowledge for different reasons. Some people, according to the authors, have attitudes favoring sharing due to altruism, as a result of reciprocity, by valorization of personal relationships with others within the organizational context, or through different intentions resulting from personal goals, as already pointed out by Thomas Jr. (1997) and Ventura (2016). This makes it significant for organizations to pay attention to establishing policies and developing a culture that is oriented towards cooperation, fostering more positive attitudes towards sharing. Wolfe and Loraas (2008) argue that when there is managerial support and incentives for a more cooperative sharing behavior, said behavior tends to flow better, bringing ideas, experiences, and creativity to the organization.

Reporting research findings relating power/leadership and information sharing, Wang and Noe (2010) point out a significant influence of management's role in people's sharing attitude. The authors emphasize that perhaps this positive influence of management on sharing is a consequence of the belief of subordinates that the manager/leader has experience in the field—competence power, as argued by structuralist authors—and/or has the power to reward them for a more cooperative behavior. Ventura (2016) found a significant relationship between managers' postures and availability for sharing. According to the author, "the managers with positive attitudes towards sharing can encourage sharing among their subordinates, confirming that there is an intersection between employees' attitudes and how they are managed" (Ventura, 2016, p. 183).

Another pole pointed out by Silva (2005) refers to the structure that emphasizes the architecture established and adopted by the organization, i.e., its structural design. Mintzberg (1995, p. 10) defines organizational structure "as the total sum of the ways in which the work is divided into distinct tasks and how coordination is achieved between these tasks." Expanding the concept of structure, Sahay and Gupta (2011) argue that organizational architecture concerns how work and workers are organized and divided into functional areas

of the organization, considering the competencies of organizational subjects, formal rules and procedures, and how power is delineated and distributed throughout the organizational hierarchical chain.

Relating structure and the availability for information sharing, correlated research indicates that the structure, depending on its form, can be an obstacle to sharing (Floriano, 2010)[2]. Supporting this statement, Wang and Noe (2010), analyzing various studies, point out that centralized structures tend to become an impediment to sharing because decision-making power is concentrated in the hands of a few, making, in this proportion, the environment more political. It is in this environment that information gains power, becoming a significant inhibitor to sharing. Studies reported by Wang and Noe (2010) demonstrate that the power of information and/or knowledge tends to turn those who possess into a "superior being" compared to those who do not have such information. Concepts such as "secrets" and "guardians of information" are used in reference to these individuals who, by personal decision, do not want to share what they know. In her studies, Ventura (2016) confirmed this perspective, finding data that indicates that Human Resource Management policies regarding job positions' distribution create an environment of competition and internal conflicts. In the studied case, these policies encourage the development of coalitions and strategies, as described by Morgan (2002), creating a scenario contrary to the exchange of experiences. This scenario configures the metaphor of the Political Arena proposed by Morgan when he argues that politics "[...] comes from the diversity of interests that gives rise to 'arrangements,' negotiations, and other processes of forming coalitions of mutual influence that so affect the life of the organization" (Morgan, 2002, p. 182-183).

On the other hand, decentralized structures provide more participative environments, facilitating interaction among organizational members, which can lead to more trustworthy relationships. In other words, relationships based on the "mutual feeling that none of the parties involved exploits the vulnerabilities of the other" (Barney; Hansen, 1994, p. 176).

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2 Cited by Queiroz *et al.*, 2017.

Research conducted by Ho, Kuo, and Lin (2012) indicates that trust in the workplace is a significant stimulus for a person's availability for sharing information and/or knowledge. This relationship was confirmed by Ventura (2016), when she reported that the variables of trust and interpersonal relationships impact the availability for sharing. According to the author, interpersonal relationships, based on trust, developed in the workplace, tend to extend to "life outside of work," strengthening trust and being cited by organization participants as a justification for information sharing and as a way to nullify the existing politics in the daily work. The data found by Ventura (2016) indicate that trust and interpersonal relationships were the elements that stood out the most as stimulators for the availability to share.

Another element that is part of the molecular structure of organizations, according to Silva (2005), is organizational culture. Retrieving the concept of organizational culture, it is noted that, according to Morgan (2002, p. 125), it gathers characteristics that make organizations like "mini societies that have their own distinct patterns of culture and subculture" that can be translated "into shared beliefs or meanings, fragmented or integrated, supported by various operational norms" rooted in the organization's identity and routine. Thus, one of the roles of culture is to create this cohesion in the organizational daily life.

However, culture has another extremely significant role: to be a mechanism for behavioral control of organization members. Through subtle and consensual mechanisms, organization participants accept and reinforce the control that culture performs by outlining the limits and the format of action within the organizational space. Da Silva *et al.* (2009, sp) argue that "a deeper way to impose the values of the company is to condition employees through practices, infiltrating in these individuals a new identity, being modified concomitantly with the insertion of this individual into the organization." Thus, culture internalizes in individuals, performing what Motta (1970) points out as a "change in self-image," leading them to develop a new behavior that is more consistent with their organizational role.

Consequently, organizational culture sets the tone for the organization, establishes the colors and nuances that will internalize in people's identity,

transforming them into organizational beings. Corroborating this analysis, Pagès *et al.* (1987, 24) state that "the organization produces an individual in its image and likeness, capable of reproducing it." In this way, a culture centered on innovation, cooperation, and trust will stimulate innovative behaviors in the same proportion; in other words, culture will act as a mediator that, interacting with other situational elements, influences the availability of organizational participants to share. Or it limits behavior if the context is contrary to a cooperative system.

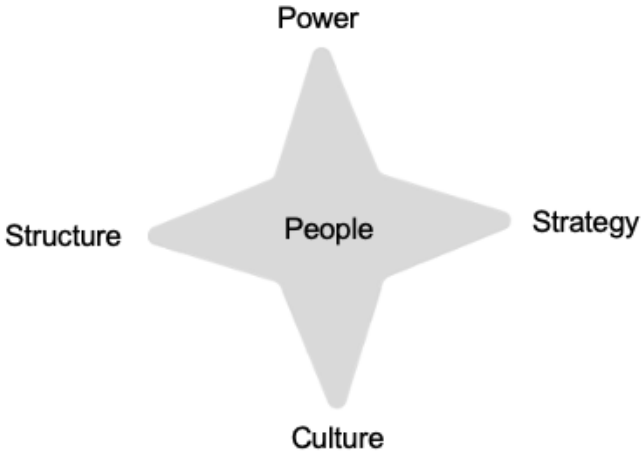
In the last pole of the molecular structure, the "strategy encompasses the mission, vision, objectives, and policies established by the organization" and that necessarily will guide the organization (Silva, 2005, p. 37). According to Chandler (1966), it is the strategy that will define the entire organizational context, meaning that the structure follows the strategy. In this logic, the importance of the environment is emphasized, which will cause organizations to modify and evolve linked to the variables that the market offers them. Supporting this analysis, Mintzberg (1995) states that aiming to maximize positive responses to environmental demands, organizations will improve their level of management and their processes, seeking to adjust to the pressures received.

Thus, seeking to meet these environmental conditions, organizations define strategic postures that will shape the management form and practices in their internal context. Miles and Snow (1984) state that the strategic position defined by the organization will emphasize certain positions within the management process, thus influencing culture, power relations, and organizational architecture for better alignment with environmental conditions. In other words, according to the authors, the strategic postures chosen by the organization will influence management processes and practices (Miles; Snow, 1984). Supporting this perspective, Silva (2005, p. 26) highlights that the organization, in its environmental analysis, must consider the factors that "block it, condition it, and pull it in certain directions or paths of development" so that they can manage them or adapt to them through new formats.

From these conceptual aspects regarding the poles that form the molecular structure of organizations, it is necessary to consider the human being as an

integral part of it. It is considered that the person who integrates different organizations acts reciprocally within this molecular structure. In the same direction that they are controlled and a key player in the political game articulated in organizations, organizational subjects are also rational and have as main focus their own interests. Thus, to complete the model proposed in this study, people will be considered as the central core within the molecular structure suggested by Silva (2005) as shown in Figure 2.

Figure 2 — Conceptual Model of the research



Source: Adapted from Silva (2005).

The reason for incorporating people into this proposed molecular structure by Silva (2005) is justified by the centrality of people in the process of sharing information and/or knowledge. It also considers all the resources within organizations, such as technology, physical infrastructure, the layout adopted by departments, and the size of the organization. In the perspective of Chanlat (1996), when proposing to consider the human being in any study, one should avoid a fragmented perspective and consider them as a complete being composed of multiple dimensions. In other words, take them as a "generic and singular" being, a concrete being, but different from all others in their potentialities; an

"active and reflective" being that thinks and acts in function of the context perceived by them; a "being of words" because they have the ability to express reality, both internal and external, through language; "a being of desire and impulse," where rationality and irrationality are confronted in the search for pleasure and control; a "symbolic being" that uses signs, metaphors, and allegories in their actions; and a "space-time being" because they are inserted in a space and a temporal cycle that shapes their history (Chanlat, 1996, p. 26).

All of this justifies the relevance of this study so that an increasingly developed level of understanding aligned with the reality and complexity of the organizational universe can be achieved.

METHODOLOGICAL PATH

The methodological design that guided the paths taken in this study has as its central point the theoretical issues presented on organizational variables and information sharing. Aligned with the study's objective, both qualitative and quantitative strategies were used to shape the research. Following the conceptions of Gonçalves and Meirelles (2004), this research is initially classified as an empirical investigation of an exploratory nature and, in a second moment, as descriptive and explanatory through a case study. Gil (2012, p. 27) points out that exploratory research, from their central emphasis, aim to "develop, clarify, and modify concepts and ideas [...] [...] increasing the level of understanding about the subject," which is supported by the intention to develop and validate a model that reflects the organizational context in the information sharing scope.

The descriptive focus, as argued by Malhotra (2019), seeks to present data that describe characteristics related to a studied group, aiming to establish relationships between them. In the scope of explanatory research, based on Gil (2012), the goal is to make the theme more intelligible by identifying the factors that determine or contribute to the occurrence of the fact. In other words, the aim is to clarify organizational elements and their degree of influence on the availability for sharing among organizational subjects.

As for the data collection technique, documental research was used with the goal of diagnosing the necessary information about the researched unit in order for the Organization Structure and Strategy established by its managers to be designed and understood, as pointed out by Silva (2005). Thus, information about the company's strategic planning, its structural design, and the reasons for adopting its hierarchical architecture were sought, in addition to knowing its development history.

To identify and understand the organizational culture of the studied unit, a survey was conducted based on data collected through documentary analysis and informal conversations with some employees and managers, aiming to establish the organization's culture type based on Ferreira *et al.*'s (2002) study. This survey was conducted with administrative staff of the studied organization, taking accessibility as a parameter of choice.

Based on the data collected through documentary analysis and the survey on organizational culture, another questionnaire was constructed, associating the Molecular Structure of the Organization and the people in the organization regarding their availability to share information. This survey was designed with the intent of conducting a Path Analysis, which was used to support the achievement of the objective, i.e., the construction and validation of a theoretical model capable of explaining the availability of organizational subjects to share information based on the elements forming the organization. The Path Analysis is a statistical method that enables the identification of direct and indirect effects of explanatory variables on a dependent, or basic, variable, whose interactions and intensity degree can be explained through regression equations (Cruz; Regazzi; Carneiro, 2004). Souza (2013) points out that the construction of the causal diagram (path analysis) is made based on information from the theoretical framework on the researched theme. This way, the dependent variable was the availability for information sharing, and the considered explanatory variables were the poles of the Molecular Structure of the Organization elaborated by Silva (2005). This survey was applied online to all employees of the company, excluding only indirect employees, i.e., third parties. Respondents were stablished as employees from the 2 hierarchical levels of the company,

namely, managers and operational staff. Directors (2 people) were excluded due to their smaller number and their direct connection with the organization.

The researched unit operates in the food sector, producing processed products derived from pork, and is located in the state of Minas Gerais, Brazil. The slaughterhouse started its activities in the year 2000 and currently has a portfolio with over 230 products categorized and commercialized through its various product lines. They produce approximately 6,400 tons per month and 75,000 tons per year of products. The slaughterhouse has 1,845 direct employees and more than 900 indirect employees, making it one of the largest companies in its region of insertion. As a strategy for the coming years, the company has decided to continue growing with the goal of acquiring high-tech equipment and increasing its planted area, which will result in an increase in production capacity to slaughter 3,500 pigs per day, directly leading to an expansion of the client portfolio and an increase in market share nationally and internationally-currently, exports represent 12% of revenue, with the aim of increasing it to 20% of total revenue. In this perspective, the company envisions being recognized as a food industry both in the national and international markets.

To support this plan, the organizational structure of the company is designed following the theoretical assumptions of the functional approach. It is divided, starting from the General Shareholders' Meeting and the Board of Directors, into three hierarchical levels, comprising 2 directorates (Commercial and Administrative), 5 managers at the intermediate level, and the largest number of employees at the operational level. The sectors are harmoniously distributed and work synergistically to fulfill the objectives and growth strategy adopted by the company.

ANALYSIS AND DISCUSSION OF RESULTS

The data collected through documentary analysis regarding the organizational structure indicate that the functional model adopted by the Frigorific, following the pattern of most Brazilian companies, shows a narrowing of positions with greater decision-making powers in relation to the base, turning the pursuit of these positions into a fierce internal competition. In this process,

rationally, employees create internal coalitions and engage in political games for personal objectives. The analysis made finds theoretical support in the writings of Morgan (2002) when he draws an analogy between the organization and a political arena. However, despite this formal design, in practice, employees do not perceive it as centralized. On the contrary, they point out that power is well distributed through the hierarchy, and that there are transparent forms of recognition for employees, although they acknowledge the difficulty of "making a career" in the company. Thus, they indicate a considerable level of competitiveness in the environment, and, in their perception, the company does not seek to reduce or eliminate this competition that arises among them.

Regarding the organizational culture, the data collected via survey were analyzed under the optics of the information gathered through documentary analysis and the theoretical assumptions of Ferreira *et al.* (2002). At the beginning of its activities, due to a shortage of professionals in the region, the company hired workers from the Southern region of the country to train new employees in their work activities. In addition to these, another part of the hired employees comes from another company where the existence of consistent and lasting informal ties is observed, a relevant aspect to foster information sharing. As expected, professionals from the Southern region did not harmonize with the local culture (the slaughterhouse is located in the state of Minas Gerais), and they were dismissed from the company. Thus, the company started its activities with a cultural mix from various sources, creating a mosaic of beliefs and values that, over time, rearranged itself and created its own identity with stronger webs that intertwined and are strengthening throughout the organization's existence.

As for values, it is inferred that the company's employees, the focus of the study, demonstrate a spirit of collaboration, i.e., cooperative professionalism (Ferreira *et al.*, 2002), which creates an environment conducive to information sharing. The analyses indicate that employees show initiative and are encouraged by their superiors to have this attitude, and they are also dedicated to the company. However, despite presenting, overall, a collaborative culture, we have to consider that there is perceived to be a very strong internal competition, intentionally camouflaged, which allows us to point out the existence of a

strong inhibitor to information sharing, encouraging secrecy and stimulating the appearance of information guardians.

In a general analysis, the majority of employees predominantly evaluate the company's environment as a place that promotes satisfaction, well-being, and security, creating a calm and conducive scenario for the creation of informal bonds. The employees recognize the company's efforts to create greater internal cohesion, but due to internal competitions and the favoritism by "bosses" for some employees over others, the company is not seen as "a big family," even demotivating those who "are good." Regarding the appreciation of ideas, employees point out that there is no formal appreciation despite there being a discourse to that effect, which, from the employees' perspective, serves to favor some, reinforcing the personal choices of those responsible for the ones who are closer to them.

From the employees' perspective, there is a significant concern from the company regarding its customers, and due to this, there is a more careful outlook towards the external environment when compared to the internal environment. This way, it is inferred that organizational decisions and practices are grounded in its strategy, often overlooking the internal knowledge that the company possesses.

The data collected with the second questionnaire were analyzed with the assistance of spreadsheet software. The values provided by each individual for each group of questions were summed, forming scores for the variables (1) Information Sharing, (2) Organizational Culture, (3) Power, and (4) Strategy. Variable (5) Structure was computed based on the hierarchical level of the individuals, where a score of 1 was assigned to each individual in the operational sector, a score of 2 was given to individuals in the administrative sector, and a score of 3 was assigned to individuals in managerial positions.

After forming the scores for each variable, they were standardized based on the mean and standard deviation, using the equation presented below:

$$Padronized\ variable = (Xi - \underline{X}) / S \qquad \text{(Equation 1)}$$

Where:

Xi: value of each element of the variable X;

$\underline{X}$: mean of the variable X;

S: standard deviation of the variable X.

After standardizing all variables, a correlation matrix of the standardized variables was generated, and the correlations were unfolded through path analysis into direct and indirect effects. In this process, the information-sharing variable was considered the dependent or main variable, while the others were treated as independent or explanatory variables.

Following the unfolding of correlations between variables into direct and indirect effects (path analysis), the coefficient of determination of the causal model (R^2) and the effect of the residual variable (Res) on the dependent variable were calculated. Both were calculated according to equations 2 and 3, respectively.

$$R^2 = \sum_{i=1}^{n} (De_i * T_i) \qquad \text{(Equation 2)}$$

Where:

R^2: coefficient of determination of the causal model;

De_i: direct effect of the variable i;

T_i: total effects on the variable i.

$$Res = \sqrt{1 - R^2} \qquad \text{(Equation 3)}$$

Where:

Res: effect of the residual variable on the main variable;

R^2: coefficient of determination of the causal model.

As a first step, the values of simple Pearson correlations were established between the explanatory variables. The intention of Pearson is to establish, among the studied pairs, the degree of variation in one variable as a function of another, meaning that the two variables vary in the same direction or in opposite directions, represented by the positive or negative sign, respectively. The zero value indicates the absence of this linear relationship between the analyzed pairs, and the closer the value is to 1, it can be inferred that the linear relationship between the two is stronger. Sousa (2019, p. 19) states that 'correlation does not imply causality; that is, observing the existence of a relationship/association between variables does not necessarily imply a cause-and-effect relationship between them.'

The values of simple Pearson correlations found between the studied variables are presented in Table 1:

Table 1 — Pearson's simple correlation coefficients between study variables

	Information Sharing	**Organizational Culture**	**Power**	**Strategy**	**Structure**
Information Sharing	1,000	0,458	0,560	0,165	-0,126
Organizational Culture	0,458	1,000	0,662	0,394	-0,327
Power	0,560	0,662	1,000	0,530	-0,237
Strategy	0,165	0,394	0,530	1,000	-0,078
Structure	-0,126	-0,327	-0,237	-0,078	1,000

Source: Research Data (2023).

As observed in the table above, the highest correlation occurred between the variables Power and Organizational Culture, and the lowest correlation between the variables Structure and Strategy. The highest correlation of the dependent variable — Information Sharing — with the explanatory variables

occurred with the Power (leadership) variable, and the lowest correlation with the Structure variable. It can be inferred from the collected data that the Power variable has a direct association with the Organizational Culture variable, reinforcing the theoretical assumptions about organizational culture. Also, it can be inferred that Information Sharing is more likely to occur when power is more distributed in the organizational structure, which corroborates the theoretical assumptions about the topic. Associating the results of the Organizational Culture survey with these results, it is worth noting that employees, according to them, do not perceive the centralization that the company's organizational structure demonstrates. In their perception, power, centered on leadership, is exercised much more by individuals than specifically focused on the job position, which may explain the result obtained in the Pearson correlations.

Table 2 presents the results obtained through Path Analysis, that is, the effects of explanatory variables on the main variable, coefficient of determination values, and values corresponding to the residual variable. The Path Analysis process, developed by Wright (1921), facilitates the unfolding of the correlation coefficient into direct and indirect effects within a group of variables. Path analysis enables more accurate and rigorous estimates of the cause-and-effect relationship between variables.

Information sharing in the organizational context, based on theoretical assumptions about the theme, is practically affected by all the forming elements of the company — organizational culture, power, structure, and strategy — and by the most significant element, which is the people included in Silva's proposal (2005). From Table 2, it is observed by the coefficient of determination that the studied variables explained 35.7% of the information sharing that occurs in the company focused on the study. The variables Power (0.555) and Organizational Culture (0.185) respectively show the highest and lowest estimates in direct effect on the dependent variable, information sharing. The estimate value of the Strategy variable (-0.199) is noteworthy, being negative, demonstrating that directly it does not influence the variable information sharing. Focusing on the indirect effects of explanatory variables on the main variable, there are important results. The indirect effect of Organizational

Culture via Power was also high (0.367), which can also be observed in the Strategy variable via the indirect effect of Power (0.294), demonstrating that indirectly these variables influence each other and these, in turn, influence information sharing. They also demonstrate how these organizational forming elements are interwoven and connected, generating an ambiance that will converge to generate identities and behaviors of its employees.

The obtained residual value (0.802) is noteworthy, which in this study can be understood as the behavior of people as main actors in the act of sharing information, corroborating the research results conducted by Ventura (2016) and others previously described in this article. This value is higher when compared to the coefficient of determination (0.357), leading to the understanding that information sharing is centered and is entirely dependent on the will of the people, although indirectly influenced by the organizational forming elements. In other words, taking this value and associating it with the theoretical paradigms on the theme of sharing, it is understood that people, within the studied context, limited by the organizational forming elements, position themselves as protagonists of the act, acting based on their individual goals and on the aspects that guide their impulses.

Given these results, it is understood that the inclusion of people in the Molecular Structure of Organizations was pertinent, and it is pointed out that the theoretical model is relevant for the study of information sharing in the organizational context. And for the study of the availability for information sharing and knowledge construction, it is necessary to consider the limits and games that the elements structure-strategy-power-culture develop in the dynamics of the organization and understand that people are inserted and are an active part of this context.

Table 2 — Estimates of the direct and indirect effects of explanatory variables on the dependent variable, together with the coefficient of determination and the coefficient of the residual variable

Variable	Effect	Estimative	
Organizational culture	Direct on Information Sharing		0,185
	Indirect via Power	0,367	
	Indirect via Strategy	-0,078	
	Indirect via Structure	-0,016	
	Total — Direct and Indirect		0,458
Power	Direct on Information Sharing		0,555
	Indirect via Organizational Culture	0,123	
	Indirect via Strategy	-0,105	
	Indirect via Structure	-0,012	
	Total — Direct and Indirect		0,560
Strategy	Direct on Information Sharing		-0,199
	Indirect via Organizational Culture	0,073	
	Indirect via Power	0,294	
	Indirect via Structure	-0,004	
	Total — Direct and Indirect		0,165
Structure	Direct on Information Sharing		0,050
	Indirect via Organizational Culture	-0,061	
	Indirect via Power	-0,131	
	Indirect via Strategy	0,015	
	Total — Direct and Indirect		-0,126
Coefficient of Determination (R2)			0,357
Effect of the residual variable (Res)			0,802

FINAL CONSIDERATIONS

To propose studying information sharing in organizations is to face contextual elements that interweave and create a favorable or unfavorable ambiance for a sharing behavior. The need for knowledge creation and management in organizations has already materialized as one of the ways for them to achieve some degree of differentiation in an increasingly equal market. Technology has already established itself as one of the most important resources in our contemporaneity, and despite its importance, it is still treated as an appendix and not as a management tool embedded in organizations. Beyond the "isolated selves," technology needs to be used as a connecting point where one individual connects to another for the creation of a living network of information exchange and knowledge construction. In an organizational scenario, this aspect is more relevant.

People, when entering organizations, bring their goals and drives and expect that from then on, they will be realized. In this logic, they are willing to give themselves for the exchanges that will happen. However, the forming elements of organizations, structure-culture-power-strategy, harmonize so that organizational goals are fulfilled and achieved, not the interests of their employees. In this scenario, people are inserted and need to align themselves so that exchanges take place first in favor of the company's objectives. However, it must be remembered that there is no control sufficiently capable of controlling the human being. Within a Cartesian logic, the human being decides and, based on this decision, acts to achieve their goals. From this perspective, this study sought to understand how the main elements shaping the organization, structure-culture-power-strategy, influence and what their intensities are in relation to the availability of organizational subjects for information sharing.

As significant results, we have that these elements influence people's behavior, demonstrating that this context is interconnected and loaded with interests as the structuralist authors already preconized. The data obtained emphasize the role of power/leadership (centered on management) and organizational culture, which corroborate related research that brings the need for an environment of cooperation to encourage collaborative work and, consequently,

greater availability for sharing. Management, associated with organizational culture, stimulates, teaches, and propagates actions that lead people to understand that work, in different organizations, is essentially team-based, where collaboration is the main variable. Centralizing structures, management policies that encourage individualism, and the concentration of decision-making power in specific job positions favor individual work, which will generate fierce competition because everyone expects to achieve better positions in the organizational architecture. The logic of teamwork calls for the appreciation of people, leading to a more participative and collaborative management where the valorization of suggestions, discussions about what to do, and respect for employees' knowledge make a difference. Organizations need to understand that time is not the main aspect; in other words, it is necessary to overcome the Taylorist/Fordist paradigm, where mechanical execution is more important than building the activity. In addition to these aspects, organizational culture needs to stimulate social interactions so that trust, informal ties, and organizational identity can develop among employees. Information is shared only when it is known that it will also be received. Sharing is a two-way street, and information in organizations is vital for the process of developing any activity or any strategy adopted.

In addition to seeking to understand the degree of influence of these elements, the study sought to develop and empirically validate a theoretical model capable of explaining the availability of organizational subjects for information sharing, based on the forming elements of the organization. This model was validated and demonstrated that people are a significant part of this scenario and that they need to be considered as a fundamental element of the results that these organizations achieve. Understanding the forming elements of the organization and their influence on the behavior of people who work in it is essential so that encouraging aspects for a more conducive behavior for information sharing and, obviously, knowledge construction can be created, given the market moment in which we live, where the competitive differential is undoubtedly based on the knowledge that the organization possesses and its use for the organization's development.

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CAPÍTULO 4

The use of digital platforms to share information and knowledge

Armando Sérgio de Aguiar Filho
Armando Manuel Barreiros Malheiro da Silva
Ana Cristina Marques de Carvalho

Contemporary society has experienced, in recent years, a "multidirectional structural change" based on information and communication technologies, initially emerging in the 1960s. However, as Castells (2005) mentions, technology alone is not capable of promoting such transformation; rather, it is society's utilization of it according to its needs, values, and interests. This reasoning seems to fit well with the phenomenon of the internet. Its impact became significant, most likely due to the first thousands of users who realized the advantages of communicating and exchanging information without the need to be physically together, becoming active agents in content production and dissemination (De Jesus, 2022; Castells, 2005). That said, the process of popularization became growing and inevitable. A recent study conducted in 2022 indicated that the internet is present in the homes of 214.3 million Brazilians, which corresponds to 82% of the population (Brasscom, 2022). Based on advances in information and communication technology, digital communication networks gradually formed, becoming the central

axis of a more flexible, adaptable, and interconnected society, referred to as a network society. Digital platforms emerged within these networks, understood as a digital structure designed to organize and facilitate interactions among end-users, corporate entities, and public organizations (Van Dijck, Poell, & De Waal, 2018).

In recent years, there has been a growing interest and utilization of digital platforms. According to Van Dijck, Poell, and De Waal (2018), we are facing a true "platform society," where the majority of interactions take place via the internet. However, when analyzing the term "platform" in isolation, as an environment facilitating relationships between two or more groups, one concludes that it already existed. Consider shopping malls connecting consumers with merchants or newspapers linking subscribers to advertisers. The shift to digital platforms occurred in the 1990s, driven by the evolution of information technology, reducing the need for physical infrastructure and assets and simplifying the construction and expansion of platforms (Van Alstyne, Geoffrey & Choudary, 2016). Today, we witness the phenomenon of "platformization," the process in which digital platforms are considered key to economic progress and technological innovation, leading to profound changes in organizational structures, various sectors and services of the economy, governmental structures, and societal life (Poell, Nieberg; Van Dijck, 2020). Thanks to this process, new business opportunities, improved business processes, new informational flows, and agility in information sharing have been achieved (Zutshi; Grilo, 2019; Lima, Ferreira & Souza, 2020).

Currently, there is a multitude of digital platforms for sharing information and knowledge, such as social networks, blogs, practice communities, opinion communities, mobile apps, websites, operating systems, discussion forums, digital repositories, search engines, digital encyclopedias, among others. (Rockembach, 2013; Costa; Soares; Souza, 2020; Guarib *et al.*, 2019; Lee-Geiller; Lee, 2019; De Santana; Cabral; Da Nóbrega, 2018; De Jesus, 2022). They have been used for various purposes in different market segments, including health, education, environment, business, food, among others. However, an effective knowledge-sharing process depends not only on technology but primarily on the people who create, share, and use it, along with other related factors such

as trust, culture, favorable organizational climate, and leadership support (Al-Kurdi; El-Haddadeh; Eldabi, 2018; Ipe, 2003).

This study aims to investigate how digital platforms have been used for the sharing of information and knowledge. To achieve this, two dimensions, theoretical and empirical, were adopted. For the theoretical dimension, a literature review was conducted on articles, books, doctoral theses, master's dissertations, and websites. For the empirical dimension, a bibliometric analysis followed by a qualitative analysis was performed. The following question was defined for this study: How has scientific production in the last five years addressed the use of digital platforms for the sharing of information and knowledge? This article is structured in six sections, with the first being this introduction; the second, a literature review; the third, methodological procedures; the fourth, results; the fifth, analyses; and the last, the conclusion.

DEVELOPMENT

Knowledge sharing in organizations

Knowledge has been considered by organizations as a significant corporate asset capable of fostering sustainable development. It consists of "a fluid mix of condensed experience, values, contextual information, and experienced insight, providing a framework for the assessment and incorporation of new experiences and information" (Davenport; Prusak, 1998, p. 6). For organizations to leverage individuals' knowledge, it needs to be shared. Knowledge sharing is understood as the process of making an individual's knowledge available to others within the organization (Ipe, 2003). Supporting this concept, Takeuchi and Nonaka (2008, p.57) mention that by sharing knowledge, the organization "amplifies, organizationally, the knowledge created by individuals and crystallizes it as part of the organization's knowledge network." For knowledge sharing to occur among individuals, it is important to consider that: (a) the provision of knowledge must be a conscious action by the individual who possesses it; (b) the knowledge to be conveyed must be clear so that it can be understood,

absorbed, and used by others; (c) sharing knowledge does not mean relinquishing ownership (Ipe, 2003).

Another aspect highlighted by Takeuchi and Nonaka (2008) is that an organization cannot create knowledge without individuals, and therefore, it needs to create contexts that allow its creation. Ipe (2003) believes that there are interconnected factors influencing the knowledge-sharing process in organizations, such as: (a) the nature of knowledge (explicit and tacit knowledge); (b) motivation to share (both internal and external); (c) opportunities to share (both formal and informal); (d) the workplace culture. Al-kurdi, El-Haddadeh, Eldabi (2018) analyze this aspect more comprehensively, believing there are four main determinants for knowledge sharing: (a) technological; (b) organizational; (c) behavioral and motivational; (d) cultural.

Bellefroid (2013) understands that there are three generations of knowledge sharing. The first constitutes the most traditional form of knowledge sharing, aiming primarily to retain knowledge in the organization, especially in cases of aging employees, outsourcing, geographical distance, and restructuring. In this case, knowledge is seen as an object. The second generation is more related to the social aspect, i.e., how people cooperate and communicate for the sharing of their knowledge. In this case, knowledge sharing can occur more formally, through knowledge-sharing systems and also through brainstorming sessions, lunches, informal face-to-face meetings. The third generation is the most recent. In this generation, knowledge sharing occurs more virtually, surpassing geographical barriers. In this case, employees seek knowledge not only within the company but also externally. Digital platforms, such as discussion forums, social networks, and self-organized networks within companies that emerge and disappear continuously, are used for this purpose, demonstrating their fluid characteristic. Another trait mentioned by the author regarding this generation is the tendency for employees to act more autonomously, identify less with the organization, and more with colleagues performing similar activities. Communities of practice are an example of this tendency. In the following sections, digital platforms will be discussed, followed by their types and functions.

Digital Platforms

The first digital platforms emerged in the 1990s due to the rapid growth of Information and Communication Technologies and the development of the Internet (Ablyazov & Rapgof, 2019). They can be understood as infrastructures existing in the digital environment that enable the interaction of two or more groups (Snircek, 2017). Chiarini (2023, p.7) defines them as "networks orchestrated by a controller, which can be a company or any other organization, such as the state or the academic community." Expanding on this concept, Poell, Nienorg, and Van Dijck (2020, p. 4) associate digital platforms with "reprogrammable digital infrastructures that facilitate and shape personalized interactions between end-users and complementors, organized through systematic data collection, algorithmic processing, monetization, and data circulation."

Based on Bonina *et al.* (2021) and Cusumano *et al.* (2019); Gawer (2011), Hellemans, Porter, and Diriker (2022) present three main characteristics of digital platforms: (a) they are mediated by technology; (b) they enable relationships between groups with diverse characteristics; (c) they allow the performance of activities inherent to these groups. In addition to this, they are not restricted to geographical boundaries (Constantinides; Henfridsson; Parker, 2018). D'Andréa (2020) supports this thinking by mentioning that the factor that highlights the idea of an online platform is the adoption of a robust computational structure based (generally "in the cloud") on connectivity and data exchange. Through digital platforms, knowledge and information are shared for various purposes and in various market segments. Knowledge sharing is understood as the mutual formal or informal exchange of ideas among individuals or groups of diverse cultures in an organization (Zakaria; Ab Rahman Muton, 2022). In the economic segment, for example, they can be useful in discovering business partners; accessing data and information; identifying business opportunities; and obtaining new customer options (De Santana; Cabral; Nóbrega, 2019). In the healthcare sector, they can contribute to improving patient monitoring and services. In education, they enable the exchange of knowledge among researchers and the sharing of knowledge and experiences (De Santana; Cabral; Da Nóbrega, 2019; Corvello *et al.*,

2020). In the government and public services sector, they promote transparency, democratization of information, and transaction execution (Lee-Geiller; Lee, 2019).

Digital Platforms: Main Types and Operating Forms

Consulting the literature reveals various types of digital platforms used for the sharing of information and knowledge, which will be presented below.

Online Communities

Online communities or business networks constitute a collective form of sharing information, collaboration, and specific actions through Internet-based technologies. Such structures have become essential for gaining competitive advantages (Costa; Soares; Souza, 2020). Spagnoletti, Resca, and Lee (2015) present the distinction between the three types of social interaction present in online communities: (a) information sharing; (b) collaboration, and (c) collective action. In information sharing, content is freely made available on the network by the agents themselves, without any formal rules or control mechanisms. This is what happens, for example, on the digital platform Twitter. In the collaboration structure, agents engage in activities that require significant group coordination and governance mechanisms, such as hierarchy and specific guidelines. Wikipedia is an example of a collaboration structure. In the collective action structure, the aim is to reach a consensus and decision-making that represents the group's identity, with shared values and trust. Examples include electronic participation applications used by social movements, political parties, and governments. According to the needs of different user classes, digital platforms can assume a specific architecture, not necessarily encompassing the types of interaction structures mentioned.

Guarib *et al.* (2019) understand that depending on the purpose, there can be various types of online communities, which can be grouped into: online knowledge sharing communities, communities of practice, blog communities, social media, health communities, innovation communities, brand communities, transactional communities and opinion/review communities.

Websites

Websites, a combination of the words "web" and "sites," constitute pages stored on Internet service providers that can be accessed by anyone connected to the network, potentially including information, images, photos, videos, and sounds (Website, 2022). Websites are used by companies for the following purposes: (a) collecting information about their audiences; (b) updating on their activities; (c) providing information to the mass media; (d) offering online services; (e) making products available online (Do Amaral; Guimarães, 2008). In the case of the government, websites, by sharing information, contribute to transparency and citizen engagement (Lee-Geiller; Lee, 2019).

Mobile Applications (APPS)

Applications, or apps, as they are commonly known, are small software programs developed or acquired exclusively for mobile applications, with the aim of meeting a specific need (Aplicativos, 2022). Downloaded from virtual stores, apps emerged with the popularity of smartphones and have been used by various market segments. Their main characteristics are portability and connectivity, as they allow easy access to users, 24 hours a day, anywhere. Not to mention the applications offered through them (Tibes; Dias; Zem-Mascarenhas, 2014; Da Silva, 2018).

Digital Repositories

Digital repositories are online databases that systematically organize the scientific production of a specific institution or thematic area. They may contain files in various formats, democratizing access to information, preserving institutional memory, and contributing to the learning process (Ibict, 2017; Silva; Feliz, 2020).

Podcast Platforms

Podcasts are communication tools capable of attracting public attention and providing access to knowledge in an enjoyable way without requiring significant effort from the listener, as programs are formatted clearly and use variations in voices and styles. Their main advantages include: (a) lightweight files that allow downloading or streaming; (b) mobility for the listener; (c) the ability to pause and listen when convenient; (d) clear and pleasant language, not requiring significant effort from the listener, as programs are formatted clearly and use variations in voices and styles (Figueira; Bevilaqua, 2022; Oliveira, Costa, Da Costa, 2023).

Discussion Forums

Discussion forums are an asynchronous tool that acts as an instrument for interactions, enhancing communication among participant groups in various directions and encouraging collaborative learning. In most forums, the introductory post consists of guiding questions associated with the discussed content (Da Silva Sopeña; De Araujo; Coelho, 2019; Soares *et al.*, 2020).

2.3.7 Wikis

Wiki, derived from the Hawaiian expression wiki-wiki, meaning fast, is a platform conceived in 1995 by programmer Ward Cunningham that promotes collaborative work, collective learning, and social interaction. It consists of a set of hypertext documents that can be freely created and modified by any user who wants to collaborate, expand, and substantiate a theme. Collaborations can be made by simple browsers such as Internet Explorer, Mozilla Firefox, Netscape, and Opera, or by any other software enabled to read HTML language and images. The online encyclopedia Wikipedia, created by the Wikimedia Foundation, is its greatest representative, having been created in 2001. Wikis have been used in various areas for various purposes (Lopes, 2007; Morais, 2019).

Online Learning Platforms (Udemy)

Online learning platforms are virtual environments that allow students to access courses, classes, materials, and videos at any time and place, enabling asynchronous learning. Such platforms are particularly interesting for students with difficulty accessing traditional educational institutions. Some examples of this type of platform are: (a) Khan Academy, a knowledge base for online video learning; (b) "Edx" platform, a base with numerous open online courses; (c) Udemy, one of the most comprehensive and widely represented online learning platforms worldwide; (d) Coursera, an educational technology company that has partnered with the best universities and organizations worldwide to offer online courses that can be watched for free (Massini *et al.*, 2023; Silva, 2014).

Business Collaboration Platforms

Business collaboration platforms are tools used to share information and promote collaboration in projects within organizations. Examples include: (a) Trello, a comprehensive project management platform with various resources and organizational tools; (b) Slack, a collaboration tool developed primarily for teamwork, widely used by companies for organization and forming small workgroups; (c) Google Drive, a kind of "virtual warehouse" that allows the creation of private or public folders and invites users to collaborate, with access control; (Peresta, 2020).

Institutional Repositories

Institutional repositories are tools that provide conditions for storing, preserving, and disseminating the production of a specific community. Their main characteristics are: (a) accepting a wide range of documents; (b) being multidisciplinary; (c) providing transparent access; (d) contributing to memory preservation (Pires; Da Silva, 2013).

METHODOLOGICAL PROCEDURES

This study was conducted through a qualitative-quantitative approach (Cervo; Bervian, 2002). Regarding its objectives, the research is classified as exploratory and descriptive (Cervo; Bervian, 2002), and concerning its nature, it is considered basic research (Zucatto; Freitas; Marzzoni, 2020). It involves a qualitative analysis associated with a bibliometric study aimed at analyzing the productivity and impact of scientific research and the researcher, through measurement based on various metadata from scientific publications (Grácio, 2020).

Initially, a search was conducted in the CAPES database to gather the number of scientific articles published on the topic in the last five years. Subsequently, a qualitative research was carried out, based on content analysis, to select the articles to be used as the study's object. For this purpose, the Protocolo de Dresch, Lacerda, Antunes Jr. (2015) protocol was used, adapted as presented in Table 1.

The CAPES database was chosen for data collection as it is considered relevant, indexing a significant number of important scientific articles, as presented by Silva *et al.* (2022). Therefore, it tends to provide bibliographic scientific material suitable for the purposes of this study.

The research resulting from the application of the Protocol (Table 1) was analyzed in two stages. Initially, the abstracts were read to identify whether they addressed the sharing of information and knowledge through digital platforms. In a second stage, content analysis techniques were employed (MORAES, 1999). For this analysis, scientific articles not discarded in the first stage were read in full to identify how the sharing of information and knowledge through digital platforms occurs. Microsoft Excel was used for data tabulation.

The search for scientific articles in the CAPES database from 01 to 09/12/2023 returned 150 research results from the intersection of the keywords used. 118 searches were disregarded, with 64 due to exclusion criterion C1, 15 due to exclusion criterion C3, 8 due to exclusion criterion C4, and 31 due to exclusion criterion C5. After the screening stage, 32 eligible elements were considered, and their abstracts were read, as this metadata is provided in the searched databases. It

is noteworthy that no articles were located when using the descriptors "information sharing," "knowledge sharing," "digital platforms," and "virtual teams."

The articles located through advanced search and term identification in the texts total 32 documents that fit within the defined scope. In the next section, a bibliometric and qualitative analysis of the collected material will be presented.

Table 1 — Protocol for article selection

Protocol	Description
Conceptual Framework	A digital platform is understood as an architecture designed to organize interactions between end-users, corporate entities, and public bodies (Van Dijck, Poell, And De Waal, 2018). Knowledge sharing is understood as the formal or informal mutual exchange of ideas between individuals or groups from diverse cultures within an organization (Zakaria; Muton, 2022).
Context	The first author is proposing a doctoral thesis research on the use of digital platforms for sharing information and knowledge in virtual teams. It is known that virtual teams use digital platforms for this sharing, which is why it is important to identify the types of information and knowledge shared through digital platforms.
Scope	Articles published in the last 5 years.
Languages	Portuguese and English e inglês.
Exclusion Criteria	CE1. Studies whose keywords do not match the descriptors of the search strategy; CE2. Studies other than scientific articles (e.g., conference proceedings, book chapters, others); CE3. Studies that do not focus on sharing information and knowledge through digital platforms; CE4. Duplicate studies; CE5. Studies unavailable for download.
Descriptors (search terms)	"Plataformas digitais"; "ambientes digitais"; "Ba digital"; "compartilhamento da informação"; "compartilhamento de conhecimento"; "digital platforms"; "digital environment"; "digital ba"; information sharing; knowledge sharing"; "equipes virtuais"; "virtual teams"
Search sources	CAPES

Source: Adapted from: Dresch, Lacerda, Antunes Jr. (2015, p.142).

ANALYSIS AND DISCUSSION OF RESULTS

The bibliographic survey conducted in the CAPES database resulted in an intentional probabilistic sample of 32 scientific articles covering the period from 2018 to 2023. Table 2 presents the selected articles with the following data: authors' names, article title, journal name, and year of publication.

Table 2 — Scientific articles selected to compose the scope of the research

Authors	Title	Journal	Qualis	Year
Costa; Soares; De Sousa	Industrial business associations improving the internationalisation of SMEs with digital platforms: A design science research approach	International Journal of Information Management	A1	2020
Zutshi; Grilo	The emergence of digital platforms: A conceptual platform architecture and impact on industrial engineering	Computers & Industrial Engineering	A1	2019
Kusumastuti *et al.*	Analyzing the factors that influence the seeking and sharing of information on the smart city digital platform: Empirical evidence from Indonesia	Technology in Society	A1	2022
Møller *et al.*	Participation through place-based e-tools: A valuable resource for urban green infrastructure governance?	Urban Forestry & Urban Greening	A1	2019
Lee-Geiller; Lee	Using government websites to enhance democratic E-governance: A conceptual model for evaluation	Government Information Quarterly	A1	2019
Zhong *et al.*	Modeling and Analysis of E-Consults in Primary-Specialty Care Referrals	IEEE Transactions on Automation Science and Engineering,	A1	2020
Hellemans; Porter; Diriker	Harnessing digitalization for sustainable development: Understanding how interactions on sustainability- oriented digital platforms manage tensions and paradoxes	Business Strategy and the Environment	A1	2022

Authors	Title	Journal	Qualis	Year
Ben Arfi; Hikkerova	Corporate entrepreneurship, product innovation, and knowledge conversion: the role of digital platforms	Small Business Economics,	A1	2021
WANG *et al.*	Different roles, different strokes: How to leverage two types of digital platform capabilities to fuel service innovation	Journal of business research	A1	2022
Keselman *et al.*	Factors influencing willingness to share health misinformation videos on the Internet: Web-based survey	Journal of medical Internet research	A1	2021
Gharib *et al.*	Trust and reciprocity effect on electronic word-of-mouth in online review communities	Journal of Enterprise Information Management	A1	2020
Dias; Aguiar Filho	Análise webmétrica do compartilhamento de informação e conhecimento gastronômico via youtube®	Encontros Bibli	A2	2020
Sousa *et al.*	Em busca de categorias de mansplaining: pesquisadoras compartilhando informações sobre violências sofridas	Liinc em Revista	A2	2019
Parsons *et al.*	Digital informed consent: modernising information sharing in surgery to empower patients	World Journal of Surgery	A2	2023
Peral *et al.*	Using visualization to build transparency in a healthcare blockchain application	Sustainability	A2	2020
Joshi *et al.*	Assessing effectiveness of humanitarian activities against Covid-19 disruption: The role of blockchain-enabled digital humanitarian network (BT-DHN)	Sustainability,	A2	2022

Authors	Title	Journal	Qualis	Year
Yaqub; Alsabban	Knowledge Sharing through Social Media Platforms in the Silicon Age	Sustainability	A2	2023
Chakraborty; Persis; Mahroof	Exploring the Academic–Industry Collaboration in Knowledge Sharing for Supplier Selection: Digitalizing the OEM	IEEE Transactions on Engineering Management	A2	2023
Marchegiani; Brunetta; Annosi	Faraway, not so close: The conditions that hindered knowledge sharing and open innovation in an online business social network	IEEE Transactions on Engineering Management	A2	2020
Feo *et al.*	Shedding light into the need of knowledge sharing in H2020 thematic networks for the agriculture and forestry innovation	Sustainability	A2	2022
Corvello *et al.*	An investigation on the use by academic researchers of knowledge from scientific social networking sites	Sustainability	A2	2020
Pinheiro; Paixão; Barroso	Avaliação do uso do twitter no sistema de bibliotecas da Universidade Federal de Sergipe: estratégias de marketing digital	Revista digital e Biblioteconomia e Ciência da Informação	A3	2020
De Morais; Da Silva Brito; Dos Santos Garcia	Metodologias ativas e ágeis na escola e em redes sociais como forma de conscientização e prevenção ao uso de drogas	Revista Intersaberes	A3	2020
Mezhuyev *et al.*	Evaluation of the likelihood of friend request acceptance in online social networks	IEEE Access	A3	2019
De Bernardi; Bertello; Venuti	Online and on-site interactions within alternative food networks: Sustainability impact of knowledge-sharing practices	Sustainability	A3	2019

Authors	Title	Journal	Qualis	Year
De Santana; Cabral; Da Nóbrega	Novas tecnologias de informação e comunicação e o caso específico do blog: contribuição para o sistema educacional escolar	Esferas	A4	2018
Macedo *et al.*	O uso do aplicativo whatsapp nas práticas de gestão do conhecimento: O caso de uma comunidade virtual informal de profissionais na área de tecnologia	Perspectivas em Gestão & Conhecimento	A4	2018
Lima; Ferreira; De Souza	Direito ao esquecimento e desindexação da Informação: ambivalências e desafios no ambiente digital	Logeion—Filosofia da informação	A4	2020
Vallefuoco *et al.*	A multidisciplinary telerehabilitation approach for supporting social interaction in autism spectrum disorder families: an Italian digital platform in response to Covid-19	Brain Sciences	B2	2021
Yoshimoto *et al.*	The impact of interprofessional communication through ICT on health outcomes of older adults receiving home care in Japan–A retrospective cohort study	Journal of General and Family Medicine	B3	2022
Lin *et al.*	Social Welfare Analysis under Different Levels of Consumers' Privacy Regulation	Journal of Theoretical and Applied Electronic Commerce Research	B4	2021
Amin; Ali; Smeaton	Visual selective attention system to intervene user attention in sharing Covid-19 misinformation	ArXiv	C	2021

Source: Research data (2023)

The highest concentration of works was recorded in the year 2020 (n=10). It was observed that in the years 2019, 2021, and 2022, the production was more or less homogeneous, ranging from 15.6% (n=5) to 18.8% (n=6). However, in 2018, the production was significantly reduced, with only 2 studies, representing 6.25%. The increase in the number of publications in 2020 is explained by the phenomenon of virtualization that intensified with the advent of the Coronavirus pandemic, consequently generating greater scientific interest in publication. The reduced number of articles in 2023 can possibly be explained by the fact that the data collection was conducted in the first semester of the year, a period during which some studies are still being analyzed by the journal's peer review team.

Analyzing the affiliation of the researchers, it is evident that it is quite diverse. The majority of studies are from Brazilian, Chinese, and Italian researchers.

Consulting the source of the collected materials, it is observed that the scientific articles were published in journals from various fields, suggesting that the topic has been approached in an interdisciplinary manner by the academic community. Most of the articles were published in the fields of library science and information science (25%, n = 8); environmental, cultural, economic, and social sustainability (25%, n = 8).

Deepening the issue of using digital platforms for information and knowledge sharing, the main focus of this study, it was found that the following digital platforms were used for this purpose: (a) online communities such as social networks, blogs, business networks, collaborative crowdsourcing platforms, and online review communities; (b) websites; (c) apps; (d) B2B interaction operating systems. The most used digital platforms were online communities, with a focus on social networks and other networks (business, humanitarian, food, thematic, crowdsourcing platform). Digital platforms are used in various fields, with a focus on health and sustainability.

Regarding social networks, it is observed that they were widely used for sharing information and knowledge in different areas, namely: gastronomy, academic environment, technology, social, health, education, environment, business. The following tools are used: Youtube, Twitter, WhatsApp, school

social network, online social network of smart cities, online business social network, academic social network.

Regarding blogs, it was noticed that they were used for information and knowledge sharing in a more discreet manner. The areas that utilized them were social and educational. Other online communities, such as business networks, online evaluation networks, and crowdsourcing platforms, were also widely used for sharing information and knowledge in the following areas of activity: business, health, sustainability, agricultural/forestry.

It was found that websites were used in essential areas for the population: health, sustainability, and public service. The latter, in particular, contributed to the democratization of government services. Apps were used for the sharing of information and knowledge in the fields of health and sustainability. In the first area, where usage was predominant, it was directed towards improving patient care. For the sharing of information and knowledge, B2B interaction operating systems were used in the following different areas: industrial engineering, health, automotive, and health.

FINAL CONSIDERATIONS

In this research, a qualitative-quantitative approach was adopted through a bibliometric study, which proved to be suitable as it provided not only data on academic-scientific production on the subject but also detailed information on how digital platforms are being used for the sharing of information and knowledge. In terms of academic-scientific analysis and based on the temporal cut and the researched information source, it was found that the year 2020 recorded the highest number of studies, a fact justified by the phenomenon of virtualization that intensified with the advent of the Coronavirus pandemic, consequently generating greater scientific interest in publication. The theme has been discussed in an interdisciplinary manner by researchers from various countries; however, Brazil had the highest number of studies, followed by China and Italy, demonstrating the increasing use of digital platforms for the sharing of information and knowledge. Studies have been predominantly published in high-impact journals both abroad and in Brazil (Qualis A1 and A2 abroad and

Qualis A3 and A4 in Brazil), which may indicate that the studies are considered relevant, innovative, and of high quality in the scientific community.

In qualitative terms, it was evident that online communities were the most used digital platforms for sharing information and knowledge, with a focus on social networks and other similar platforms. Another noteworthy aspect is the breadth of areas in which digital platforms have been used for the sharing of information and knowledge. The health and sustainability sectors are the ones that have most utilized digital platforms, justified by their direct impact on individuals' lives and the planet, a topic discussed worldwide. A limitation of the research is that it was conducted only on one database (CAPES) and used Portuguese and English as language filters. Another important limitation is the fact that no articles were found when using the descriptors "information sharing," "knowledge sharing," "digital platforms," and "virtual teams" together. On one hand, this is positive as it highlights that the study conducted in the doctoral thesis by the first author on "information and knowledge sharing using digital platforms by virtual teams" is unique and represents a relevant research opportunity.

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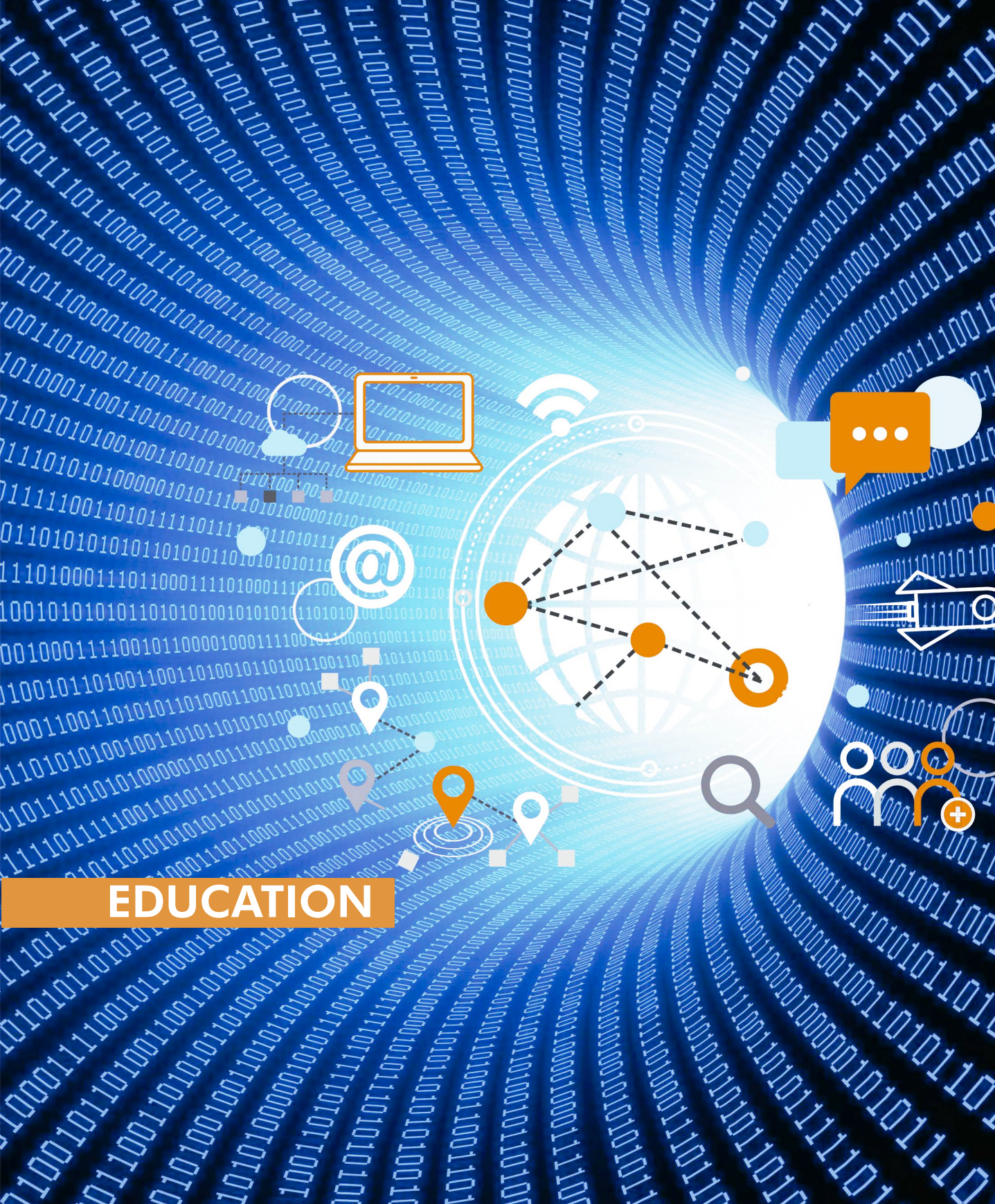
EDUCATION

CAPÍTULO 5

University-enterprise partnership in educational context

Barriers and facilitators

Sara André
Mário José Batista Franco

In order to meet the demands of an increasingly global and competitive market, modern organisations are constantly changing and adapting, and it is increasingly difficult to act in isolation, oblivious to their surroundings (Awasthy *et al.*, 2020). Technological development has revolutionised the way we interact, encouraging the creation of cooperation networks and strategic partnerships, which are crucial for organisations to maintain their growth and create value (Awasthy *et al.*, 2020).

Strategic partnerships result from the formulation of cooperative relationships between organisations with a view to leveraging resources and making up for internal shortcomings, thus enabling them to overcome barriers and chart alternative paths for their growth and development. (Das & Teng, 2000; Mckelvie & Wiklund, 2010; Mirkovski *et al.*, 2023; Rindova *et al.*, 2012).

This openness on the part of organisations marks a transformation in the way they view competitiveness (Das & Teng, 2000). The reasons that lead an organisation to look for strategic partnerships are varied, but they are aimed at

making up for a lack of internal resources (Mckelvie & Wiklund, 2010)leading to an awareness that success depends on cooperation with other organisations (Das & Teng, 2000).

The formation of partnerships in the organisational context has essentially been characterised by relationships with other organisations or through the creation of consortia (Carney & Gedajlovic, 1991; Lu & Xu, 2006; Mirkovski *et al.*, 2023; Rindova *et al.*, 2012).. However, more recently, organisations have become increasingly interested in establishing partnerships with academic institutions as a way of adding value through the development of scientific knowledge (Borges *et al.*, 2022). As a result, the literature has also been developing knowledge about this new type of strategic partnership, particularly with a view to identifying the factors that enhance and possibly condition its success (Awasthy *et al.*, 2020; Lopes & Lussuamo, 2021; O'Dwyer *et al.*, 2023; Zhuang & Shi, 2022) .. Another line of research highlighted concerns identifying the competitive advantages of these partnerships for their players (Awasthy *et al.*, 2020; Borges *et al.*, 2022; Franco & Haase, 2015; Gupta, 2023; Nave & Franco, 2019; Pereira & Franco, 2022; Wagner *et al.*, 2021) ..

Co-operation between universities and companies contributes to regional economic development, the enhancement of human capital, innovation and the transfer of knowledge and technology. (Lilles & Rõigas, 2017) strengthening the competitive advantage of companies (Borges *et al.*, 2022).

Despite the high level of interest in this topic, there is still a great need to expand knowledge in order to fill existing research gaps, especially in identifying factors that condition and facilitate this type of partnership, as well as the role of universities as centres of entrepreneurial attitude (Borges *et al.*, 2022; Rossoni *et al.*, 2023; Rothaermel *et al.*, 2007).

In order to help identify potential barriers and facilitators of these partnerships between universities and companies, this case study aims to analyse a strategic partnership between a Portuguese higher education institution (HEI) and a technology-based company with a strong presence in the national and international market. More specifically, it aims to answer the following research

question: "*What is the contribution of a university-company partnership in the educational context and what are its main barriers and facilitators?*".

The main contribution of this study is the development of a model for improvement, based on two strategic axes: strengthening the interaction between the company and the educational institution and promoting conditions that maximise student involvement and motivation.

Structurally, this chapter is divided into 5 sections. Section 2 covers the literature review, section 3 the study's methodology, section 4 presents and discusses the results and section 5 concludes with the study's conclusions.

LITERATURE REVIEW

Strategic partnerships

The main objective of organisations is to create value, which is reflected in growth and productivity. To achieve this, an organisation needs to possess resources and capabilities that differentiate it from other competitors (Mirkovski *et al.*, 2023; Xie *et al.*, 2023). An organisation can develop organically, as a result of its normal activity, or hybridly (Mckelvie & Wiklund, 2010). The latter results from the establishment of contracts with external agents in order to fulfil internal shortcomings or limitations. (Das & Teng, 2000; Mirkovski *et al.*, 2023)without jeopardising control of their assets (Mckelvie & Wiklund, 2010).

This organisational development is based on a theoretical perspective of network creation (Borgatti & Halgin, 2011)which aims for a rigorous and attentive analysis of the interactions between the various players in a given interaction (Gamper, 2022). Networking makes it possible to collaborate with different sectors and players (Marlier *et al.*, 2015)analysing different perspectives, objectives and visions (Head, 2008) which provide new solutions to problems and encourage new ways of working, new contexts and new strategies. (Keast *et al.*, 2007).

Strategic partnerships are a hybrid form of organisational growth, defined by voluntarily formalised cooperation agreements between organisations, with

the aim of boosting synergies and leveraging resources that promote competitive advantage (Das & Teng, 2000; Mckelvie & Wiklund, 2010). These co-operative relationships enable faster and less costly growth (Mckelvie & Wiklund, 2010).They enable organisations to overcome barriers and chart alternative paths for their growth and development. (Mirkovski *et al.*, 2023; Rindova *et al.*, 2012).. On the other hand, these partnerships require all players to possess differentiating resources that add value to the partners and to the co-operation itself (Bradley *et al.*, 2011; Garnsey & Leong, 2008).In other words, all the players must have differentiating internal resources that are essential for the partnership to materialise.

A partnership is characterised by the sharing of goals, objectives and knowledge in a defined process between two or more players, including an equitable distribution of tasks and advantages with equal influence and participation, and it is essential that there is a relationship of respect, responsibility and transparency between them. (Parent & Harvey, 2009).

In the view of Rybnicek & Königsgruber (2019)the first consideration in establishing a partnership should be whether it is really relevant and with whom it makes sense to establish it. Only once these questions have been answered thoughtfully will it make sense to go ahead with the partnership, aware that choosing the wrong partner could jeopardise your objectives (Banal-Estañol *et al.*, 2013).

The success of a partnership depends on multiple factors, both intrinsic and extrinsic to each of the parties involved, which have been widely studied with the aim of contributing to strategies to achieve this success. Mohr & Spekman (1994) defined that commitment, coordination and trust between the partners, together with quality communication and problem-solving orientated conflict resolution techniques, are basic characteristics of successful partnerships. Flexibility and a relationship of trust based on facts are also key to the success of partnerships. (Willem & Lucidarme, 2014)are also crucial.

Das & Teng (2000) based on *resource-based theory*, define four fundamental pillars of success: justification, creation, structural preferences and performance. As for justification, this lies in the potential for value creation resulting from

the combination of resources between the players. The authors also identify that characteristics of resources inherent in their protection against imitability, mobilisation or substitution act as catalysts for a partnership.

Strategic partnerships tend to be conceived over a relatively long period of time, with a view to creating inherent value in the product as a result of pooling the resources of all the players involved (Mckelvie & Wiklund, 2010). But Mirkovski *et al.* (2023) identify another type of partnership, of a more immediate nature, which aims to provide organisations with competitive tools for leverage in their market of implementation, through the acquisition of services. According to the same authors, these partnerships are a more flexible alternative, based on contracting services that the organisation does not have, but which are essential to it at a certain point in its development.

Educational institutions as strategic partners

Universities are experiencing a period of strong pressure on their role in promoting strategic co-operation networks with their environment, which facilitate the transfer of knowledge and the consequent creation of value and resources for the market. (Borges *et al.*, 2022; Das & Teng, 2000; Fritsch & Franke, 2004; Gupta, 2023; Lilles & Rõigas, 2017; Wagner *et al.*, 2021). On the organisational side, there is growing interest in developing strategic partnerships with educational institutions (Borges *et al.*, 2022) However, the capacity to achieve this still needs to be improved, especially on the part of educational organisations *(Pau & Iordache-Platis, 2021).* Even so, educational institutions are an essential *stakeholder* for technology-based companies (Liu, 2020) with their most pressing relevance in terms of business incubation and the development of research centres (Borges *et al.*, 2022) .. This emphasises the differentiating role of educational institutions in the creation and transfer of knowledge, technological development and the development and implementation of sustainability practices, particularly in the education sector (Franco *et al.*, 2014; Fritsch & Franke, 2004; Lilles & Rõigas, 2017; Nave & Franco, 2019; Wagner *et al.*, 2021) ..

Regardless of the type of partnership or actors, the relationship between universities and the outside world is seen as an important promoter of change (Pau & Iordache-Platis, 2021) with a direct impact on regional development and the retention of human capital (Lilles & Rõigas, 2017; Lopes & Lussuamo, 2021)and enabling companies to find solutions to their needs (Nave & Franco, 2019)at the same time as promoting the credibility of educational institutions and the practical application of their research (Franco & Haase, 2013)and cementing their contribution to the socio-economic development and job creation of a region (Borges *et al.*, 2022; Lilles & Rõigas, 2017; Nave & Franco, 2019; Rothaermel *et al.*, 2007)..

Educational institutions also play an indispensable role in supporting organisations with less Research and Development (R&D) capacity, but which depend on it to produce new technology in an increasingly knowledge-based economy (Borges *et al.*, 2022; Lilles & Rõigas, 2017). Thus, the knowledge produced by educational institutions must take into account the needs of organisations (Rothenberg, 2007). Only knowledge produced with the aim of helping to respond to the difficulties and shortcomings of companies will be the driving force behind strategic partnerships and capable of contributing to the competitive advantage of the organisation and, consequently, its region (Lilles & Rõigas, 2017). Rothaermel *et al.* (2007) characterise this phenomenon as "academic entrepreneurship".

To help improve the efficiency of partnerships between educational institutions and the business sector, Awasthy *et al.* (2020) propose a generic *framework* whose underlying hypothesis emphasises the importance of a harmonious environment for achieving more effective collaborations. This analysis framework consists of 14 steps that include understanding the variety of interactions, identifying stakeholders, understanding the "why", identifying and appointing suitable people and involving leadership, ensuring basic partnership characteristics, establishing effective communication, strengthening the strategy for disseminating the knowledge produced, considering intellectual property constraints, adopting policies that promote a collaborative spirit, developing strategies to encourage collaboration, focusing on social

capital resources, establishing incentive and reward plans and managing the partnership and involving alumni. O'Dwyer *et al.* (2023) define four distinct phases in the development of these partnerships: the embryonic phase, the initiation period, the commitment phase and, finally, the establishment phase. The partnership begins to achieve its first results, with the prospect of continuity. Adopting the analysis framework proposed by Awasthy *et al.* (2020), in the embryonic phase will make it possible to resolve some of the barriers that characterise these partnerships. These barriers are identified as a lack of trust between the parties, fear of losing intellectual property, conflicting objectives regarding the nature of the partnership, little experience on the part of the universities and, often, a misperception of these partnerships as being of low value *(Borges et al., 2022; Lopes & Lussuamo, 2021; O'Dwyer et al., 2023)*.. These barriers can arise at any stage of the partnership's development (O'Dwyer *et al.*, 2023) It is therefore essential to anticipate and prevent them from the outset of the partnership. It is therefore essential for educational institutions to develop the capacity to build bridges with the business community, boosting the transfer of knowledge and linking its production to the real needs of organisations. (Awasthy *et al.*, 2020; Borges *et al.*, 2022). To this end, Awasthy *et al.* (2020) highlight a proactive attitude, the development of collaborative platforms, boosting entrepreneurial skills, raising awareness of products and businesses, adapting academic training to develop knowledge that is applicable to the reality of organisations and seeking to involve their alumni who work in companies, making them vehicles for strengthening relations with companies as the main focuses for intervention by educational institutions.

METHODOLOGY

Type of study and case selection

Considering the research question defined for this study, we opted for a qualitative methodology by conducting a descriptive, exploratory and cross-sectional case study (Meirinhos & Osório, 2010). This case study aims to analyse

a strategic partnership established between an academic institution of higher education and a technology-based company in Portugal, aimed at students wishing to enter higher education in the field of IT. The students involved in the programme are allowed to combine practical training in a business context with their academic training. To this end, the students begin their training by completing a two-year Higher Professional Technical Course (CTeSP), designed to meet the training requirements and needs identified by the technology company studied here. On completion of this programme, the student must move on to a three-year Degree in Computer Science, during which they will continue their training in a business context. The programme has a total duration of 5 years.

This case study is of the phenomenological type, as it aims to study a specific phenomenon (Fortin, 2009). To this end, three key players in this partnership were approached: a manager from the technology organisation, a teacher from the educational institution and three students attending the training programme.

Data collection and analysis

To collect the data, a structured open-ended interview script was drawn up, allowing the interviewees to provide additional information to complement the content of the question (Vilelas, 2020; Yin, 2018). The script was drawn up by the authors themselves, taking into account the research objectives.

The interviews took place in the first two weeks of June 2023 and lasted between 30 and 60 minutes. In order to allow for joint and participatory reflection on the issues raised, the three students were interviewed together (collective interview). All the interviews were conducted via digital channels and the answers were transcribed by the interviewer.

Table 1 shows the characterisation of the interviewees according to age, gender and academic qualifications completed.

Table 1 — Characterisation of interviewees

		Manager	Lecturer	Students		
				E1	E2	E3
Features	Age	33	47	25	20	28
	Gender	M	M	M	M	M
	Academic qualifications	Master	Master	Higher technical course	Higher technical course	Higher technical course

After the interviews were carried out, their content was analysed. This analysis aims to understand, interpret and problematise the subjects' intentions and meanings (Crusoé & Santos, 2020)allowing for an in-depth description of the phenomenon (Bogdan & Biklen, 1994).

PRESENTATION AND DISCUSSION OF RESULTS

After pre-analysing the content of the interviews, the information obtained was categorised and coded, and finally the data collected was analysed in a critical, reflective and impartial manner by the researcher (Bardin, 2018) leading to the inferential interpretations presented here.

After a first reading of the content of the interviews and taking into account the objectives of the study, the following indicators were defined to categorise the responses: *(1)* Perception of the partnership*; (2)* Main advantages; (3) Main barriers and *(4)* Contributions for improvement.

Table 2 summarises the main contributions made by each of the interviewees in relation to the indicators defined above.

Table 2 — Systematisation and presentation of results

	Manager	Lecturer	Students
Individual perception of the partnership	Pride and personal satisfaction Active participation Support in solving students' problems Active role in bringing educational institutions and companies closer together Discovering a personal love of teaching	Valorisation in relation to Previous CTeSP Visibility and distinction of the educational institution Better career opportunities for students New challenge to meet the demands of the programme and the business world	Unique opportunity Possibility of changing your life Collaboration with a leading company in the sector New doors to the future Possibility of joining a promising professional area Reconciliation of theoretical and practical training
Main advantages	**For the educational institution**		
	More attractive training offer Greater knowledge sharing Encourages young people to stay in the region Greater contact with the business world Greater attractiveness for other companies in the sector	More attractive career opportunities Visibility and prestige in relation to other institutions Differentiation Valuing the institution and the region itself	Interest from students outside the region Attracting students who would not otherwise apply for higher education
	For the students		
	Training funding Payment of support grant Monitoring by professionals specialising in the sector Participation in real projects Facilitating entry into higher education and the labour market	Financial support to attend academic training Differentiating opportunity Competitive advantage resulting from the acquired curriculum Reconciliation of theoretical and practical training	Opportunity to make a degree with lower costs Obtaining a monthly grant Theoretical-practical learning and integration into real projects High level of professional experience upon graduation Monitoring by specialised professionals

	Manager	Lecturer	Students
	For the company		
	Training of professionals more suited to the company's needs and greater availability of specialised professionals in the region Better knowledge of future professionals over time, allowing us to offer work proposals that are more tailored to their objectives and characteristics. Social participation Proximity to educational institutions and their students		
Main barriers	Difficult selection process It doesn't always allow for the selection of the best High consumption of organisational resources for monitoring trainees Teaching institution still unfamiliar with the programme	The existing model does not clearly provide for students with low academic performance not to be approved Bureaucratic and procedural complexity	Unable to take advantage of student worker status Difficulty in reconciling study and work time, sometimes leading to an excessive daily load (in number of hours) Holidays conditioned to a single month of the year No career progression during the programme
Improvement contributions	Greater flexibility in selecting participants Greater flexibility in adapting the teaching curriculum, so as to make it possible to constantly adapting to the complexity of the business world More active and collaborative participation of the educational institution in the programme	Greater flexibility in teaching programmes, allowing better reconciliation with the company's needs.	Possibility of choosing class times, within the shifts available, to facilitate academic success Days allocated for study Student worker status Valuing the best students Opportunity to experience different areas within the company Training grant updated between editions in line with the cost of living.

Proposed improvement model

Strategic partnerships between universities and companies, especially in an educational context, are crucial for bridging existing gaps at the operational level of companies (Nave & Franco, 2019) there is sometimes a mismatch between scientific training and the needs of organisations (Nsanzumuhire *et al.*, 2021). This type of partnership is also beneficial for the surrounding regional development, contributing to the retention of specialised human capital (Lilles & Rõigas, 2017; Nave & Franco, 2019; Rothaermel *et al.*, 2007) .. However, these partnerships can be complex due to the different origins of the players involved, different expectations and difficulties in reconciling interests (Bruneel *et al.*, 2010). It is therefore pertinent to analyse existing partnerships as a way of identifying and resolving possible agency conflicts (Mckelvie & Wiklund, 2010).. It is important to emphasise that the barriers identified in the context of these partnerships are often the driving force behind their continuity, since it is through their identification and resolution that mechanisms for continuous improvement are defined. (O'Dwyer *et al.*, 2023) are defined.which are so essential for success.

Based on the inference of the results presented by the analysis of the interviews, and taking into account the relevance of promoting contexts that facilitate co-operation (Awasthy *et al.*, 2020; Bruneel *et al.*, 2010), a model is proposed to promote the success of strategic partnerships in the context of education, conditioned by the needs identified in this study, taking into account the complexity inherent in this type of partnership (Awasthy *et al.*, 2020). In this sense, the proposed model is based on the main barriers identified by stakeholders and their contributions to improvement.

Any model aimed at strengthening a co-operation relationship must necessarily consider the potential for creating value as a result of this partnership (Das & Teng, 2000). In this sense, the new model must endeavour to preserve and reinforce the advantages identified and, at the same time, resolve or soften the barriers described.

In line with these assumptions, the model presented here focuses on strengthening the interaction between the company and the educational institution,

as well as promoting conditions that maximise student involvement and motivation, as its strategic axes.

The axes and respective action strategies are presented below, paralleling the existing literature.

1) Strengthening interaction between the company and the educational institution

   - Ensuring reliable and efficient communication channels between those responsible on both sides, emphasising the importance and centrality of relationships of trust. (Rossoni *et al.*, 2023) in the success of interaction between organisations (Madhok, 2006) and aware of the negative repercussions that their absence represents for these strategic partnerships (Marinho *et al.*, 2020). It is also necessary to ensure good coordination between departments within educational institutions, free from bureaucracy and central management constraints (Rybnicek & Könicek, 2006). (Rybnicek & Königsgruber, 2019).
   - Liu (2020) emphasises the particularity of partnerships involving the technology sector as being more susceptible to differences in objectives and motivations. In this way, the need for transparency, flexibility and clarity in identifying the objectives, motivations and expectations of each of the players becomes even more pressing, as well as a clear perception of the surrounding social, economic and legal context, as fundamental to their success. (Rossoni *et al.*, 2023; Rybnicek & Königsgruber, 2019).
   - Reorganisation of the candidate selection process, corresponding to the needs of the organisation, without prejudice to the general selection principles. The relevance of adapting the academic context to the needs of companies is the subject of reflection in the scientific community, with Marinho *et al.* (2020) emphasise that cultural and philosophical differences between universities and companies are often the reason why partnerships between the two are not established or

are not successful. These are the barriers that need to be overcome for future success.

- Identification of possible constraints to greater involvement by the educational institution and definition of alternatives. This aspect has been the subject of reflection by the scientific community, emphasising that, despite universities' awareness of the importance of these partnerships, there are still a number of internal constraints that can compromise their capacity to act (Pau & Iordache-Platis, 2021). One of these is their high dependence on government institutions, which shape and define programme content, making it difficult to reconcile them with the particular requirements of companies (Nsanzumuhire *et al.*, 2021; Odei & Novak, 2023) .. However, an entrepreneurial vision on the part of the management of the teaching units stands out as essential, acting as facilitators in solving problems and constraints that may arise (Veltri *et al.*, 2022).
- Reorganisation of teaching content, taking into account the rapid transformation and development of the technological sector. Although the need for rapid adaptation in this direction is recognised, there is little literature to corroborate the way forward (Rybnicek & Königsgruber, 2019).

Rybnicek & Königsgruber (2019) emphasise flexibility, honesty and clarity, coupled with a frank understanding of the social, economic and legal context surrounding the partnership, as fundamental to its success.

2) Promoting conditions that enhance student involvement and motivation

- To provide a balance between the theoretical and practical components of this training.
- Make study days/hours available, especially during exam times.
- Ensuring the physical and mental well-being of students.

- Flexibility in holiday arrangements, allowing short breaks throughout the year.
- Promoting greater flexibility in the allocation of academic timetables, enabling these students to have a better balance between the theoretical and practical components.

At this point, it is worth highlighting the lack of literature that reflects on the impact and perception of students about these partnership programmes between universities and the business sector. This scenario may be related to the fact that most of the existing literature on the academic context focuses on centres of knowledge and technology production (Rossoni *et al.*, 2023) and not from the perspective of training specialised human resources, which is the context of this strategic partnership. It is therefore of the utmost importance to promote reflection on the constraints and enablers of student entry and participation in these programmes, identifying strategies and models to promote their adherence.

Lastly, although not mentioned in the inferences of this study, Borges *et al.* (2022) point to the pertinence of considering the career development of the teachers involved in these partnerships as a promoter of their success.

FINAL CONSIDERATIONS

The aim of this study was to identify the perception of the different players in a strategic partnership established between an academic institution of higher education and a technology-based company, as to their contribution and the main barriers and facilitators they identify in this regard.

From the analysis carried out, a model for improving a partnership of this type was proposed, based on the contributions of each of its representative links, but also supported by the existing literature on strategic partnerships between universities and companies.

Generally speaking, the proposed model focuses on dynamics that promote a relationship of trust and clarity between the various players, ensuring that their objectives and expectations are identified and articulated. It emphasises

the need to strengthen cooperation between universities and companies, especially with regard to the selection and entry of candidates, as well as adapting academic content to the needs of the business world. On the other hand, as far as the students involved in the programme are concerned, there is a need to promote a better balance between the academic and practical components.

The realisation of this case study makes pertinent and valid contributions to strengthening this specific partnership, but it also contributes to improving the understanding of partnerships between universities and the business sector. Aware of the relevance of the subject and the fragmentation of information that still exists (Rothaermel *et al.*, 2007)we suggest analysing other partnerships between educational institutions and the business sector and even carrying out quantitative studies, with the aim of identifying their main constraints and facilitators, pointing to interventions to improve and strengthen their effectiveness. Bearing in mind that these partnerships must remain attractive in order to ensure that students are attracted, there is a lack of research that reflects on the constraints and enablers of their entry and participation, so it would be pertinent to develop studies that address this issue.

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CAPÍTULO 6

Digital literacy and english language teaching-learning process

Pollyana Pimenta Abud Rolim
Zenaide Dias Teixeira

Year after year, education has changed, as has the way of teaching. Paulo Freire (1996, p.13) states in his work that "teaching is not transferring knowledge, but creating possibilities for its production or construction". In this sense, in recent years, new technologies have advanced in the social environment and, therefore, have been an important resource in the teaching-learning process. The much talked about globalization materializes and communication, due to the internet, has become more agile and motivated, a process that formal education must accompany. Information moves at the speed of light and students are not happy just remaining in the classroom listening passively to explanations and concepts, the student, more than ever, wants to be an active part of the knowledge process (Bottentuit Junior, 2020).

Technology has been used in the classroom as an effective and motivating resource in the teaching-learning process, it is widely used in active methodologies, which place the student as the protagonist. In this context, gamification is a resource that moves students and improves learning, obtaining better results,

and can be seen as a synonym for evolution in pedagogical practice, modern practices with a great capacity to attract students to the process of building the knowledge. Devices such as tablets, smartphones, smart computers and robots are increasingly included in classrooms. Technological advancement is undeniable and all this progress associated with the need to rethink the way of teaching leads to the emergence of gamification.

DIGITAL LITERACY AND ENGLISH LANGUAGE LEARNING (EL)

Technology is today one of the most important mediators of teaching. It is responsible for all social evolution in the world. Technology is extremely necessary in the school context, as it enables the breaking of paradigms and, in a critical and creative way, transforms education and society and is transformed by it (Berbert, 2020).

Technology, in addition to having developed rapidly as a science, has facilitated scientific development in different areas. Countries have competed with each other basically in terms of their technological capabilities and that is why they joined forces and agreed their scientific activities and thoughts in the battle of scientific progress, so that they could keep up with this massive technological revolution (Ismail, 2013 *apud* Alharbi, 2020).

The digital world is part of contemporary times and its use in a creative way can provoke and transform the educational world and, it is important to highlight that the English language is the key language of the digital world (Anjos e Santos, 2014). Some authors even claim that there is an interconnection between the two, let's see:

> Authors such as Moita Lopes (2005) and Graddol (2006) point to the interconnections between the two, mutually reinforced by the need and ease of communication, especially after the advent of the Internet. It seems undeniable that the processes associated with contemporary globalization have contributed to strengthening this interconnection. As many argue, this is an ambiguous process, in which both the discourse of inclusion and exclusion are invoked (Anjos e Santos, 2014, p. 80).

Therefore, the teacher's guidance is essential for the student to be able to investigate, create, innovate and have free debate, forming a productive personality, based on the method of organized and logical thinking, capable of solving problems and finding solutions (Alharbi, 2020).

In this sense, Paulo Freire (1996) argues:

> For me, in the difference and "distance" between naivety and criticality, between the knowledge of pure experience and what results from methodically rigorous procedures, there is not a rupture, but an overcoming. Overcoming and not rupture occurs to the extent that naive curiosity, without ceasing to be curiosity, on the contrary, continuing to be curiosity, criticizes itself. By criticizing itself, thus becoming, I allow myself to repeat, epistemological curiosity, methodically "rigorizing" itself in its approach to the object, connotes its findings of greater accuracy (Freire, 1996, p.8).

Therefore, technology is not an objective in itself, but a tool and a means to achieve the true objective of the development of education, which is the development of thought, persuasion and understanding it, linking it to scientific application and training of the scientific body through technological learning (Alharbi, 2020).

Luckily, educational technology is a method of thinking that deals with education and learning, characterized by flexibility and permanent movement, which is concerned with the curriculum development process, a field that facilitates the education of individuals through careful and organized identification, developing and organizing all available educational resources (Alharbi, 2020).

Digital technology is one of the multiple meanings of the whole, technology, that is, it means everything, from using a device to a good evaluation of the class and a systematic analysis of the elements of the teaching process, to just being able to contact an absent student (Alharbi, 2020). It is the analysis of the whole by the parts (Morin, 2007).

Confirming, Anjos-Santos, Gamero and Gimenez (2014) argue that in an educational context it is extremely necessary to discuss digital knowledge and how digital technologies operate in education, let's see:

> On the other hand, in the educational context, it is necessary to provide spaces for discussing the need to use digital technologies as mediators of contemporary social practices, based on pedagogical activities that enable the use of these tools in a critical and creative way. neither as a determinant of society's processes nor as determined by the uses we make of it (Anjos-Santos, Gamero and Gimenez, 2014, p. 81).

It should be noted that technology has changed education greatly in recent decades, and in response to all the changes in education that have emerged in recent years associated with complexity theory, the mediating power of technology can unite various other knowledge. It is a fact that the use of new technologies in education has transformed the classroom.

Certainly, digital technologies have innovated the ways in which knowledge and information are produced. It is clear that there is no way to talk about education without talking about technology which, when mentioned, leads directly to digital literacy. The importance of digital inclusion and digital literacy for education reform is undeniable. The knowledge provided by digital media should not be separated from others.

Digital literacy and learning English are fundamental citizenship requirements, however, it must be a critical literacy in which the teaching-learning process aims to learn the English language interconnected with new technologies (Anjos-Santos, Gamero e Gimenez, 2014 and Alharbi, 2020), that is, linked and shared knowledge.

In this sense, Morin (2007, p. 45) argues that "the constitution of an object that is simultaneously interdisciplinary, polydisciplinary and transdisciplinary allows for the creation of exchange, cooperation and polycompetence".

Freire (1996) states that, for knowledge to be constructed, criticality is necessary, as well as a break from naive curiosity to critical, epistemological curiosity.

In fact, an inquisitive concern and a search for clarifications are necessary so that knowledge grows and evolves (Freire, 1996). Now we can see from the reading above that it is the understanding of all the authors previously mentioned that digital literacy must be linked to the process of teaching and learning the English language (EL), as this is the key language, the mother tongue of the digital world. However, digital literacy must be worked on in schools in a critical and transdisciplinary way (Anjos-Santos, Gamero and Gimenez, 2014, Morin, 2007 and Freire, 1996).

In other words, for Freire (1996) technology can be seen positively by some and negatively by others, let's see:

> As a present manifestation of vital experience, human curiosity has been historically and socially constructed and reconstructed. Precisely because the promotion of ingenuity to criticality does not occur automatically, one of the main tasks of progressive educational practice is precisely the development of critical, unsatisfied, indocile curiosity. Curiosity with which we can defend ourselves from "irrationalisms" arising from or produced by a certain excess of "rationality" in our highly technologized time. And it does not go into this consideration of those who, on the one hand, do not deify technology, but on the other, demonize it. From those who look at it or even peer at it in a critically curious way (Freire, 1996, p.18).

According to Anjos-Santos, Gamero and Gimenez (2014), in fact, it is evident that new technologies have enabled several transformations in the world, as well as improving social practices, and it is no different with education:

> [...] social practices permeated by the use of digital technologies are increasing in the constitution of the contemporary individual. Send emails; access Facebook and respond to messages from friends, comment on photos, share videos and photos with different captions; watch and/or post a video on YouTube and

> react to posts that appreciate different YouTube videos; search for information on forums on how to carry out a certain activity; read and evaluate the opinions of different consumers on the web about products we want to purchase; complain and protest against damage caused to the consumer on the websites of the company supplying the product; Monitoring and requesting information from government bodies about public spending in a given area/ sector are some of the many social actions that we can carry out through the use of different TDIC (Anjos-Santos, Gamero and Gimenez, 2014, p.84).

It is possible to see that with each passing year new literacies are emerging and that many of them revolve around the internet, which is one of the main sources of information today and, based on all this, education is responsible for preparing their students for this evolution (Anjos-Santos, Gamero and Gimenez, 2014) and digital literacy is one of the tools for this preparation.

However, all this preparation is not easy, as there is still resistance on the part of some educators or even unpreparedness on the part of some schools, which even after the recent pandemic context and the use of digital media have become resistant to increasingly "digitizing" the school space.

Anjos-Santos, Gamero and Gimenez (2014) state that:

> Planning, producing and implementing pedagogical practices for learning IL using TDIC are one of the greatest challenges for IL teachers in the 21st century. However, a critical and responsive understanding of the roles of digital literacies in contemporary society is urgent to provide opportunities for the construction of theoretically and reflexively based pedagogical projects Anjos-Santos, Gamero and Gimenez, 2014, p. 85).

Based on this, the school community must act collaboratively, as social actors building new meanings in this digital world, transforming the computer screen into a place for building knowledge and not just a place for searching for information, that is, the computer screen it becomes a socially elevated place with a repertoire of infinite meaning (Moita Lopes, 2010).

Buzato (2009, p.5) argues that literacy originating from the digital world should not be separated from others, since if worked together, the student's creativity becomes elevated and differentiated. The digital world is immense, full of new things and this one, being explored from a perspective of complex thinking, in which knowledge of the whole and the parts are important, so this knowledge becomes complete.

In this context, Morin (2007) says:

> The intelligence that only knows how to separate reduces the complex nature of the world to disjointed fragments, divides problems and unidimensionalizes the multidimensional. It is an intelligence that is increasingly myopic, color-blind and cross-eyed; Most of the time it ends up being blind, because it destroys all possibilities of understanding and reflection, eliminating at the root the possibilities of a critical judgment and also the opportunities for a corrective judgment or a long-term vision (Morin, 2007, p .19).

Finally, it is a consolidated understanding among some authors that digital literacy fosters and expands the possibilities of acquiring knowledge and information, as well as expanding social practices that in an intertwined way contest and modify each other in a continuous way, and even though digital literacy it is directly related to learning IL since this is considered the main language of the digital world (Anjos-Santos, Gamero and Gimenez, 2014, Moita Lopes, 2010 and Buzato, 2009).

Buzato (2009) argues regarding literacy and technological evolution, that the literacies provided by the digital context should not be separated, removed from the others, because when articulating the different types of literacies, technology is a necessary condition for the effective participation of the student, that is, digital literacy must be a topic present in universities and technology is a central theme of the transdisciplinarity proposed by Morin.

Contextually, digital literacy can be defined as "the knowledge of complex and heterogeneous networks that connect literacies (social practices), texts, subjects, means and skills that are managed, intertwined, contested and

modified mutually and continuously, through virtual means or the influence of Information and Communication Technologies" (Buzato, 2009, p. 22).

The transformation that universities need goes further. It is necessary to create new pedagogical proposals to include the development of social cognitive capabilities associated with multimedia and technological development in a critical way (Anjos-Santos, Gamero and Gimenez, 2014).

Anjos-Santos, Gamero and Gimenez (2014) argue that:

> Our role, as teachers in contemporary times of constant change, is "to provide young people with carefully planned opportunities so that they can learn how to become critical navigators in the new landscape of literacy in digital times" (Snyder, 2009, p.44). In this sense, inter— and transdisciplinarity are seen as guiding principles for language education. The responsibility of literacy educators is to provide young people with carefully planned opportunities to learn how to become critical navigators in the new landscape of literacy in digital times (Anjos-Santos, Gamero and Gimenez, 2014, p. 87).

Although there are several forms of technology involvement in the world, what has emerged considerably around the school environment is certainly the internet, since day after day our students gather around it, allowing them to explore the extensive Information and Communication Technologies (ICTs) and become increasingly available in an online and connected environment (Anjos-Santos, Gamero and Gimenez, 2014).

Technological information permeates the world, society and consequently schools. It is almost impossible today to find a student who does not have access to a smartphone, a computer, an internet café or a tablet. Social networks are popular among children, teenagers and adults, and most of them are connected and share knowledge and information through tiktok, instagram, facebook, twitter, among others. And computer games have never been more popular. Geek culture has never been as popular as it has been in recent years (Berbet, 2020).

Araújo and Rocha (2020), when carrying out their empirical research, state that digital literacy has interdisciplinary importance and is highly complex, let's see:

> This makes us believe in the appropriation of technologies by these students, that is, the research students are digitally literate and use technologies according to their interests and needs. Which leads us to agree with Araújo (2018, p. 715) when mentioning digital literacies as "dynamic processes that can lead the subject to obtain knowledge for the development of skills in digital environments for the literate practice of digital communication" (Araújo and Rocha, 2020, p.176).

Soares (*apud* Araújo and Rocha, 2020) argues that digital literacy is acquiring new digital technologies by reading and writing on screens. In fact, digital literacy should not only be a topic discussed in language classes, but also in other subjects, due to the different levels, modalities (face-to-face and distance), its complex nature and also, because communication in this digital era affects all teaching areas.

Digital literacy is necessary for the individual to be able to read, write, express themselves in different digital contexts and corroborates the learning of EL, as the internet enables new forms of discourse, learning, teaching and communication. In addition to being socially important, the practices promoted by digital literacy bring linguistic improvement, as this communication on the internet becomes a type of survival in this cyber society (Araújo e Rocha, 2020).

Multiliteracies are imposed on today's society, as critical literacy is part of the objectives of learning an EL. Different textual genres emerge on the internet and understanding and producing different textual genres is crucial for those who study English. As already said elsewhere, the great difficulty faced by Brazilian schools in the EL teaching process is infrastructure and unpreparedness of teachers. Corroborating Anjos-Santos, Gamero and Gimenez (2014) state:

> However, learning English in regular Brazilian schools still suffers from many problems, such as a large number of students in the

> classroom, few and inadequate teaching resources, a minimum workload for the subject and teachers with insufficient training to deal with the contexts difficult situations they find themselves in. Although we have seen specific and localized improvements in some regions, in general, there is a widespread feeling that English learning needs to improve (Anjos-Santos, Gamero and Gimenez, 2014, p. 81).

Digital literacy and language learning can represent a great challenge. And the essential points in literacy for the school to use revolve around the internet, as online and connected environments encourage the possibilities of communication and therefore the use of EL. The possibilities for using EL in the online environment are countless and can be enhanced. Therefore, Anjos-Santos, Gamero and Gimenez (2014) (2014) state that:

> Similarly, we witness a range of possibilities for real practice of using the English language (hereinafter EL) in different contexts through access to different digital literacy practices. EL learning can potentially be expanded by incorporating the use of TDIC into formal pedagogical practices (in the case of public schools, for example) as well as learning practices in non-formal contexts (the need to understand and use the English language to play a video game, for example) (Anjos-Santos, Gamero and Gimenez, 2014, p. 85).

Digital literacy has also been seen as a potentially empowering practice, as it provides new ways of accessing information, new ways of reflection and knowledge. Some students use digital media for entertainment, but contact with EL when watching a video or listening to a song in English is undeniable. Social networks, especially Instagram and TikTok, have EL as their primary and official language.

The EL teaching-learning process involves communication and develops skills such as speaking, writing, reading and listening, and all of these skills are improved in digital literacy and the use of technologies. Furthermore, when teaching EL, the teacher must also prepare his student for society, instructing him in critical and reflective knowledge.

In these terms, Moita Lopes (2010) asserts:

> Converging with the didactic proposal of interrelationship between IL learning, the use of digital technologies and interdisciplinary dialogue to awaken critical awareness for the citizenship of these students inserted in this contemporary society, we make use of our professional repertoires (including theoretical frameworks) and of multisemiotic instruments (Moita Lopes, 2010), in which we sought to transpose the limits of the computer screen as a space for searching for information to provide a space for "construction, dispute, contestation of meanings" (Moita Lopes, 2010, p. 398).

Social media are today a great tool for learning EL, as they involve language skills as well as communication. The use of the internet connects people through their social networks, and with critical learning of the different worldviews that we find there, students can learn (Anjos-Santos, Gamero and Gimenez, 2014).

Furthermore, in these social media, students can produce texts or videos promoting interaction and knowledge. In fact, when making a post on Facebook, Instagram or LinkedIn about a certain subject, the student's first act is to research, read and only then will the writing or video be produced. It can be seen from the above that digital literacy comprises the EL teaching-learning process, and that social networks are an excellent tool for improving students' linguistic skills.

In this sense, Anjos-Santos, Gamero and Gimenez (2014) present a study on the use of social media and report that the students studied engaged in different readings in a critical and analytical way:

> Regarding the use of the English language, participants engaged in different readings of texts on the chosen subject to decide which information to choose. The students also engaged in listening to different videos to choose the one that best suited their socio-communicative purposes. The meanings constructed, and the positions assumed, by the participants in the production of Glogster point to the potential of activities around digital literacy practices for situated and interdisciplinary learning of the English language. The incorporation of different voices in Glosgter's production

> also points to the critical and analytical potential provided by the activity (Anjos-Santos, Gamero and Gimenez, 2014, p. 97).

It is clear that the use of social media has its limitations and negative points, however students' engagement in digital literacy and communicative practices is possible. Social media lead students to write in the digital world, making them participants in globalized communication.

CONSIDERATIONS

Thus, it is possible to perceive the importance of digital literacy for the EL teaching-learning process and the introduction of new technologies. With the advent of globalization and electronic media interconnecting and bringing students closer to the world, it makes them closer to the world and education evolves and teachers, when dealing with this unknown world, improve their praxis, preparing themselves for all this intellectual growth.

This literacy concerns the use of media so that the student can feel included and respected within their knowledge, and the ecosystem in which they are inserted. Therefore, with the spread of technologies, digital improvement is necessary not only for students but also for teachers.

In this sense, students are exposed daily to a range of information and knowledge. Thus, the teacher plays a fundamental role in this process, since sometimes the student searches for information here and there, without context, without checking the source and other academic questions necessary for this knowledge acquired through the virtual environment to be valid.

Therefore, it is up to the teacher to instruct their students so that, within all this digital literacy, they can move through the digital environment in a healthy and fascinating way, evolving as citizens and learners.

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CAPÍTULO 7

The use of digital technology in education

Information management strategies to promote technological inclusion

Adna dos Santos Lemos
Camila da Silva Oliveira Monteiro
Andréa Kochhann

The integration of digital technologies in the educational field, especially the use of gaming platforms, has proven to be a promising and challenging frontier in contemporary education. As observed by Kenski (2007), the digital era has not only reshaped the way we interact with information but also the pedagogical strategies employed in the classroom. This study delves into the use of technology in education, exploring how such tools can be integrated into the teaching-learning process, particularly in Basic Education, and how information management can optimize this integration, contributing to technological inclusion.

The relevance of the study is anchored in the growing need for teaching methods that engage students in an effective and meaningful manner. According to Alonso (2008), technology in education is not just a supplementary tool but a crucial component that transforms the educational environment. In the context of Basic Education, the integration of gaming platforms represents an opportunity to revitalize teaching, making it more attractive and interactive

for students. This perspective is reinforced by Belloni (2012), who emphasizes the importance of new media in education, especially in an increasingly digitalized world.

Information management emerges as a central aspect in the effectiveness of the integration of games in education. According to Dall'Asta and Brandão (2004), the didactic transposition of educational software requires a deep understanding of how these tools can be adapted and applied in the educational context. In this sense, the study seeks to analyze how information management can support the effective implementation of games in education and identify the challenges associated with this practice.

The study aims to explore teachers' perceptions of the use of digital technologies in the classroom, as outlined by Carvalho (2009) in her analysis of networks and virtual learning communities. This perspective is complemented by Freire's (1967, 1982) view of education as the practice of freedom and the importance of the act of reading, suggesting that the integration of games in education can promote greater autonomy and engagement of students in the learning process.

This article has the general objective of analyzing how the integration of digital technology in education, combined with information management strategies, can contribute to promoting technological inclusion and improving the teaching-learning process. To achieve this objective, the research addresses the following specific objectives: investigate how digital technology is being integrated into education as a mediator of learning; analyze how information management can be applied to support the effective implementation of digital technology in education; and identify the challenges associated with the use of digital technology in promoting technological inclusion. The guiding question of this study is: How does the use of digital technology in education, combined with information management strategies, contribute to the promotion of technological inclusion and the improvement of the teaching-learning process?

This research was conducted with teachers in Brazilian basic education who are members of GEFOPI — Study Group on Teacher Training and Interdisciplinarity. The choice of this group is justified by their experience and

involvement with educational technologies, as highlighted by Landin (2015). The methodological approach adopted in this study is qualitative, including document and literature analysis, as well as the collection of empirical data through questionnaires applied to teachers. This methodology follows the recommendations of Gil (2002).

The study adopts a qualitative approach, privileging an in-depth understanding of the phenomena related to the integration of gaming platforms in education. As highlighted by Triviños (1987), qualitative research is suitable for exploring complex and contextualized dimensions of social phenomena, such as the use of educational technologies. Document and literature research form the basis of this study. According to Gil (2002), literature research allows the construction of a robust theoretical framework, essential to substantiate the analysis of empirically collected data. Primary and secondary sources, including academic articles, books, and official documents, are reviewed to understand current trends and existing debates on the integration of digital technologies in education. Authors such as Kenski (2007) and Belloni (2012) provide a comprehensive view of the implications of digital technologies in teaching and learning.

For the collection of empirical data, a questionnaire was used, created on the Google Forms platform, following the recommendations of Lakatos and Musgrave (1979) regarding the importance of structured research tools in qualitative studies. The questionnaire was administered to Basic Education teachers affiliated with the GEFOPI group, with the aim of capturing their experiences, perceptions, and challenges faced in integrating technology into teaching. This instrument includes both open-ended and closed-ended questions, allowing for a detailed analysis of the responses.

The data collected through the questionnaires will undergo qualitative analysis, as guided by Gil (2002). The content analysis technique will be used to interpret the participants' responses, enabling a deeper understanding of teachers' attitudes and perceptions regarding the use of games in education. This approach is consistent with André's (2008) recommendations on data analysis in qualitative research.

This study is based on an extensive literature review, including authors such as Moran, Pierre Levy, Kishimoto, Rolim, and supported by normative references such as the BNCC, in addition to recent empirical and theoretical studies in the field of educational technology. The theoretical discussion aims to deepen understanding of the dynamics of integrating digital technologies in education and how information management can facilitate this process.

THE USE OF DIGITAL TECHNOLOGY AS A MEDIATOR IN THE TEACHING-LEARNING PROCESS IN BRAZIL

The incorporation of digital technologies in education has been one of the most significant transformations in the contemporary educational landscape. This section seeks to explore this evolution, considering the works of researchers such as Kenski (2007) and Alonso (2008), who provide insights into how digital technologies have reshaped teaching and learning practices.

The journey of digital technologies in education began with the introduction of computers in schools, representing a significant shift in the way content was delivered and assimilated. As Kenski (2007) points out, these initial steps marked the beginning of an era in which education started to transcend the physical confines of classrooms. This period was marked by experimentation and challenges, with educators and institutions seeking to understand the best use of these new tools.

Alonso (2008) discusses the importance of ICTs — Information and Communication Technologies in teacher training. The author argues that educators' training for the efficient use of ICTs is essential to ensure that technologies are integrated effectively into the educational process. This training goes beyond technical mastery, encompassing an understanding of how ICTs can be used to facilitate and enrich the learning process.

As digital technologies became more accessible and advanced, there was a significant transformation in both the curriculum and pedagogical practice. Dall'Asta and Brandão (2004) highlight that the introduction of educational software brought new possibilities for didactic transposition, allowing complex concepts to be presented in more interactive and engaging ways. This evolution

also brought challenges, requiring educators to constantly update and adapt to new tools and methodologies.

The evolution of digital technologies in education brought with it a series of challenges. As Belloni (2012) points out, media education has become a crucial aspect, requiring teachers to have a critical understanding of media and the ability to integrate them pedagogically. On the other hand, this evolution also opened doors to innovative learning opportunities, such as gamification and the use of augmented reality, transforming the way students interact with knowledge.

The emergence of games as pedagogical tools is one of the most notable aspects of technological evolution in education. Belloni (2012) argues that games go beyond entertainment, acting as powerful educational instruments. They provide a playful and interactive environment capable of facilitating learning and increasing student engagement. This view is shared by Landin (2015), who, in her research on educational software, identifies games as valuable resources in the literacy process, especially in the early years of Elementary School. Educational games, by combining playful elements with pedagogical content, promote more active and meaningful learning.

Digital Education is one of the general competencies of the BNCC — National Common Curricular Base, aimed at developing skills and competencies for the critical, reflective, and ethical use of digital information and communication technologies. The BNCC establishes that digital education should be addressed in all areas of knowledge, from Early Childhood Education to High School (Brazil, 2017). The BNCC (2017) also emphasizes the importance of developing competencies related to the digital literacy of young people and adults, creation of digital content, communication and collaboration, security, and problem-solving. Additionally, the BNCC establishes that public institutions of basic and higher education must have guaranteed high-speed internet connectivity, suitable for pedagogical use.

Digital Education is one of the general competencies of the LDB — Guidelines and Bases of National Education Law, aimed at developing skills and competencies for the critical, reflective, and ethical use of digital information

and communication technologies. The LDB establishes that digital education should be addressed in all areas of knowledge, from Early Childhood Education to High School. Digital Literacy is one of the specific competencies of Digital Education, aiming to develop skills and competencies for the critical, reflective, and ethical use of digital information and communication technologies (Brazil, 1996).

Fantin and Girardello (2009) discuss the importance of media education in the digital age, highlighting how games can be used as tools for cultural and educational mediations. They argue that digital games, when integrated critically and reflectively into the curriculum, can contribute significantly to the development of essential skills and competencies in the 21st century.

However, the effectiveness of games as educational tools depends substantially on teachers' ability to integrate them into the curriculum. Pereira (2008) observes that the preparation of educators to use games in teaching is a critical aspect. It is not enough to be familiar with the technology; it is necessary to understand how games can be aligned with pedagogical objectives and adapted to the specific needs of students.

The evolution of digital technologies in education seems to be heading towards greater personalization of learning and the creation of more immersive and interactive learning environments. As Pereira (2008) suggests, the future of digital education will involve an increasingly integrated use of tools that support adaptive learning and personalized educational experiences.

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THE MANAGEMENT OF INFORMATION CAN BE APPLIED TO SUPPORT THE EFFECTIVE IMPLEMENTATION OF DIGITAL TECHNOLOGY IN EDUCATION

Dall'Asta and Brandão (2004) emphasize that the didactic transposition of educational software involves not only adapting content to digital formats but also the effective management of information circulating through these means. This management is crucial to ensure that digital resources are relevant, up-to-date, and aligned with pedagogical objectives. The speed at which information updates in the digital environment implies the need for constant monitoring and frequent updating of educational content.

As Kenski (2007) notes, the digital information age requires educators to have critical skills in selecting and using available information. It is not just about incorporating technologies into teaching but developing information competence that allows for the efficient filtering, interpretation, and application of obtained data. This skill becomes even more relevant in the current context, where the quantity of available information can be overwhelming and not always reliable.

The integration of ICTs in education, as observed by Alonso (2008), presents challenges in both teacher training and pedagogical practice. Educators must be able to manage information efficiently, ensuring that technologies are used to enrich the educational process. This challenge translates into the need for continuing education programs that address not only technical but also pedagogical aspects, preparing teachers to act as critical mediators in the digital age.

The ideas of Paulo Freire, particularly in "Education as the Practice of Freedom" (Freire, 1967) and "The Importance of the Act of Reading" (Freire, 1982), provide a solid foundation for rethinking the use of technologies in education. Freire advocates for a dialogical and student-centered education, where knowledge is constructed through interaction and critical reflection. In the digital context, this implies using technologies that favor student autonomy, promoting active and critical participation.

Freire's approach to literacy goes beyond the mere acquisition of reading and writing skills, encompassing the ability to "read the world." Soares (2002) extends this concept to digital literacy, emphasizing the need to understand and interpret digital information critically. The information management in educational technologies, from the Freirean perspective, should aim not only at transmitting content but also at developing a critical awareness in students, empowering them to navigate and interpret the vast universe of digital information autonomously and reflectively.

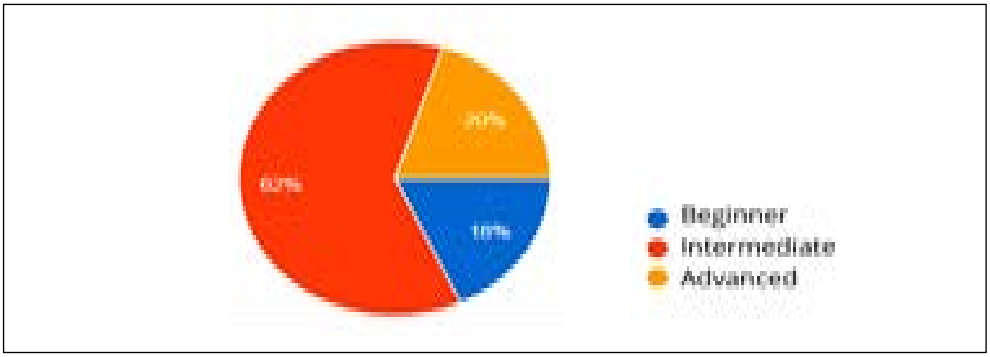
CHALLENGES ASSOCIATED WITH THE USE OF GAMING PLATFORMS IN PROMOTING TECHNOLOGICAL INCLUSION

At this point, an analysis of the structure of the data obtained through a questionnaire, combining different approaches with open and closed questions, will be conducted. The questionnaire was administered to GEFOPI participants, totaling 292 members from various fields, including teachers, lawyers, psychologists, engineers, among others. The questionnaire was answered by teachers from the Basic Education network who are part of this study group. An electronic questionnaire, generated through a tool offered for free by Google, Google Forms, was sent. It was distributed in the WhatsApp group, with the participation of 50 teachers who answered the questions within the requested period of 72 hours during the second semester of the 2023 school year. Along with the electronic form, an acceptance form to participate in this research was sent, and only participants who accepted the terms proceeded.

Regarding the participants' profile in the research, the following age groups were observed: 35-44 years (46%), 45-54 years (44%), 25-34 years (4%),

55 years or more (4%), and less than 25 years (2%). When asked about their experience with the use of technologies, 62% reported intermediate knowledge, 20% advanced, and 18% beginner.

Chart 1 — Level of experience

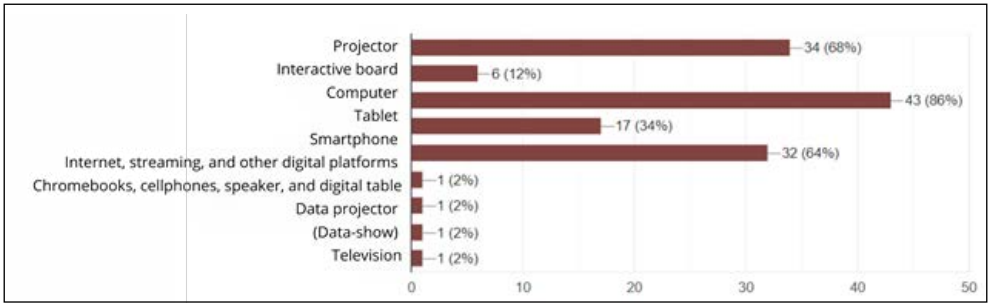


Source: Surveys (2023).

It is essential for the teacher to have skills and competencies in the use of digital technologies. Thus, digital competencies encompass the ability to effectively perform teaching tasks in digital environments, aligned with the specificities that such spaces demand in the pedagogical context. The teacher's digital skills are evident in the aptitude to apply knowledge and attitudes, promoting an efficient use of digital technology in their educational practice. This not only simplifies the teaching and learning process but also contributes to expanding the development of these digital competencies among students. (Dias-Trindade; Ferreira, 2020)

Technology is everything that man has created to make his life easier, so technology is as old as the emergence of man. Several technologies are present in the school environment, and it is up to the teacher to plan and use them in the best possible way. Teachers were asked which technologies they use the most in the classroom, and they could choose more than one option. The data on the responses are presented in the graph.

Graph 2 — Frequency of technology use



Source: Surveys (2023).

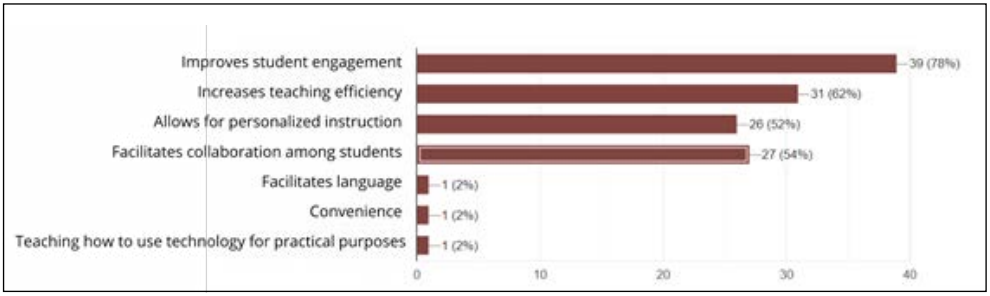
The technologies most used by the participants were the computer, projector, and smartphone. Currently, many teachers need to use the computer to carry out pedagogical work on platforms, inputting grades, attendance, lesson plans, among other tasks. The projector is used during an interactive and demonstrative class to showcase curricular content and various subjects to students. Smartphones are also used to input data into pedagogical platforms, performing functions similar to those of a computer.

The frequency of technology use in the classroom is also important for developing the skills and competencies outlined in the BNCC, as it is necessary to understand, employ, and innovate in digital information and communication technologies critically, meaningfully, reflectively, and ethically in various social spheres, including the school environment. This encompasses the ability to communicate, access and share information, create knowledge, solve problems, and take an active and authorial role both individually and collectively in life. (Brasil, 2017)

Of the 50 teachers who responded to the survey, 46% of them use technologies a few times a week, 36% every day, 12% a few times a month, and only 6% rarely. The BNCC emphasizes several times in its text the importance of using digital technologies and how they are crucial for developing competencies and skills in students. Therefore, it is important for the teacher to be able to work with the use of technologies in the teaching-learning process. (Brasil, 2017)

Teachers were asked about the main benefits they see in using technology in the classroom, with the option to mark more than one choice. The chart below shows the participants' responses:

Chart 3 — Benefits of technology use



Source: Surveys (2023).

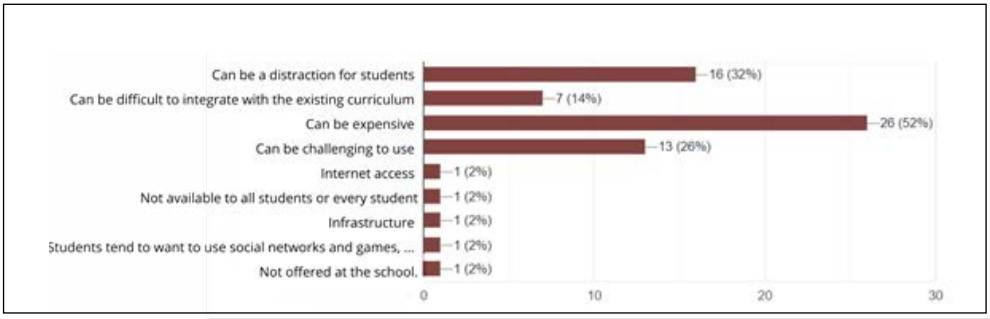
According to teachers, the use of technology can bring benefits to the student learning process, improving engagement, increasing teaching efficiency, enabling personalized instruction, facilitating collaboration among students, among other benefits. The BNCC advocates that students should acquire the languages of digital culture, contemporary literacies, and multiliteracies to explore and create content across a variety of media. This expands opportunities for access to scientific, technological, cultural knowledge, and job opportunities. (Brazil, 2017)

The contemporary era is notably characterized by technological advancement. Both computing and digital information and communication technologies are becoming increasingly present in everyday life, not limited to offices or schools but extending to our pockets, kitchens, cars, clothes, and so forth. Additionally, a significant portion of humanity's produced information is now digitally stored. This reflects the growing influence of digital technologies in both productive environments and daily activities, a trend expected to intensify further in the future. (Brazil, 2017)

There is a certain resistance among teachers to use technology in the classroom. Firstly, many teachers feel inadequately prepared to use computers in their teaching practice. They often procrastinate confronting this situation,

waiting for a time when they have the availability to take courses they consider essential or to acquire a computer, among other justifications deemed plausible. Additionally, some teachers definitively reject digital technologies. In other words, they view the use of any form of technology (whether it be an instrument, symbolic system, or organizer) that has not been an integral part of their personal and professional life since childhood as a threat to the values they cherish (SANCHO, 1998). In this survey, teachers were asked about the main disadvantages they face in the classroom with the use of technology, with 52% of responses indicating that the main disadvantage is that technology can be expensive, followed by 32% mentioning that it can be a distraction for the student, among other responses, as shown in the following chart:

Graph 4 — Disadvantages of technology use



Source: Surveys (2023).

In Brazil, access to digital technologies is still a major challenge as technology does not reach everyone. Many schools, students, and teachers do not have access to technology. Without a universal dissemination of population access to the vast universe of networked computers with technology, we will not be able to achieve control and content. This compromises not only digital democratization but also the widespread dissemination of technological advances in the economy and social benefits. (Castells, 2005)

Finally, teachers were asked how the use of technology in the classroom can improve the quality of teaching. We selected some responses for analysis,

excluding responses that were only "yes" and those without coherence with the question. The selected responses are shown in the table below:

Table 1 — Descriptive responses

How, in your opinion, can the use of technology in the classroom improve the quality of teaching?
When the teacher knows how to use and work with technology in the classroom.
It can be improved, so that it becomes something more standardized, I see many professionals using technology such as Smart TVs in the classroom just for students to watch cartoons and pass the time, these activities must be done in a more targeted and applied way.
In streamlining classes, student engagement, as well as making classes more attractive. However, it needs to be available in schools... this is not the case at the school I teach at. When I need to use it, I need to take my resources.
Greatly improves teaching and learning
Provides access to numerous online educational resources, such as digital books, video tutorials, and online courses. This can enrich teaching material and provide students with a variety of ways to learn.
Interest in technology stimulates the student, does not leave the class monotonous.
The student has a greater interest in studies
Awaken in students the socio-emotional skills found at BNCC through more meaningful and enjoyable learning.
With technology, students have immediate access to a vast amount of information. This allows them to research and learn about specific topics with ease, expanding their knowledge. Through online platforms, students can ask questions, share ideas and receive feedback from teachers more quickly.
There is a lot of content for student teaching that goes beyond books. For this reason, the use of technology expands knowledge
Agility, ease and flexibility within the teaching and learning process
Integrating theories with practical student and teacher experiences
Technology allows students to have contact with content in a more interesting format for them, as they are used to interacting and watching videos all the time on cell phones and smart TVs connected to the internet.

How, in your opinion, can the use of technology in the classroom improve the quality of teaching?
Agility in research and further questions
With use in the classroom, it provides access to online educational resources, facilitates personalized learning, promotes collaboration between students and offers new forms of assessment.
Practicality, motivation and interaction
Necessary. Technology is an ally for teaching professionals, with it we can expand knowledge of education as a whole. It is possible to adapt the content according to the students' needs, adding interactivity, agility, personification, among other ways in which there is an exchange between teacher and student, taking into account the use of technology within the classroom. And in an environment outside the classroom, technological tools can be taken into consideration that enable the explanation of what happens in the classroom for possible exchange of knowledge between education professionals. It is important that the exchange of knowledge is in an interactive way that involves and is interesting for those who are participating in the educational moment.
Student interest increases
Students access videos and have contact with other realities; through games, reports, etc.
Yes, it is a tool that promotes learning more easily and at the same time in real time, with infinite possibilities for inserting students into the digital and globalized world.
Making classes more attractive and fun.
Curiosity for research, more informed students in favor of better technological knowledge.
Technology allows greater availability of information and resources for the student, making the teaching-learning process more dynamic, efficient and innovative.
As a transdisciplinary tool, integrating knowledge and facilitating the demonstration of examples and contextual differences.
Technology needs to be worked on, taught so that students understand that it is useful and important and that they need to know how to use it in the right way, at the right time and with the right intensity and not just as a form of leisure and entertainment.
Technology can improve the quality of teaching if it is aligned with the teacher's pedagogical planning. Technology used without planning can be configured as a decontextualized practical activity that does not produce critical knowledge.

How, in your opinion, can the use of technology in the classroom improve the quality of teaching?
In addition to the student acquiring more knowledge, they experiment and resolve doubts faster, solve various citations and research, without so many obstacles and more quickly, being able to make more comparisons.
Certainly improves self-esteem, cognitive skills, appetite for learning
The use of technologies personifies education, modernizes teaching practices, integrates new knowledge, provides didactic creativity, promotes contextualized discussions, expands the visual demonstration of concepts, tools and didactic-pedagogical content, acts as a multisemiotic and integrative element of knowledge between teachers and students.
It allows for a more playful and attractive class.
By bringing teaching closer to the reality of students who are already immersed in the technological world, the possibility of enhancing teaching is greater, as students become involved and participate in the learning construction process.
Technology is a tool that assists and complements learning
The use of technology in the classroom allows student encounters to be more dynamic and different. Being "different" makes all the difference. Teaching with innovations promotes greater participation from everyone, making the educational process attractive and creative.
Agility
Satisfactorily, the contemporary world demands this standard of access to technology.
I believe it improves student motivation, presents a greater variety of resources, achieving more diverse learning and serving different groups.
Students can have greater access to knowledge, know how to research and much more information
There are certainly great chances for interaction and development/knowledge
Helping with explanations, being another explanatory method
Through technological resources, it is possible to provide resources that are more linked to the age group of the student group.
I use technology in my Educational Robotics classes every day and since the project was implemented at school, students have demonstrated improvements in reasoning, in developing activities in other subjects and improved behavior.

How, in your opinion, can the use of technology in the classroom improve the quality of teaching?
Use what attracts students' attention to consolidate the desired knowledge and learning.
Yes, because technology breaks boundaries.
Technology is a support tool to personalize classes and use assertive strategies with the contribution of active methodology.

Source: Surveys (2023).

According to the data, we have a positive perspective on the use of technology in the teaching and learning process. Some participants emphasize that technology, when effectively incorporated, can provide significant benefits, such as facilitating easier, real-time learning with ample opportunities for students to engage in the digital and globalized world, and integrating theories with practical experiences, indicating a practical approach to using technology in the classroom. Several participants consider the use of technology relevant to improving teaching, contributing to increased student interest, and providing a more attractive approach.

The use of technologies is perceived as a way to modernize teaching practices, integrate new knowledge, promote didactic creativity, and enhance the visual demonstration of concepts. Technology can be seen as a tool that provides greater availability of information and online educational resources, making the teaching and learning process more dynamic, efficient, and innovative.

The need for quality internet and suitable equipment is emphasized as an important factor for technological integration in the classroom. Some participants point out challenges, such as the need for teacher training for the effective use of technology. Technology is considered a mediator that improves student motivation, fosters greater interest in studies, and allows access to information in a more meaningful way, considering students' digital habits.

CONCLUSIONS

The analysis of the use of digital technologies in education reveals an evolution in the contemporary educational environment. Documents such as the BNCC and the LDB emphasize the importance of Digital Education in all areas of knowledge. Participating teachers recognize the benefits of using technology, highlighting increased student engagement, teaching efficiency, and facilitation of collaboration. However, there are challenges to be overcome, such as initial resistance from teachers and access to these technologies, among others. The research shows that the main disadvantage perceived by teachers is the cost associated with technology, emphasizing the importance of strategies to overcome these barriers.

The evolution of digital technologies in education points towards an increasingly personalized learning experience and more immersive environments. Effective information management is fundamental to ensuring that digital resources are relevant and aligned with pedagogical objectives, moving towards technological inclusion in Brazil. This study suggests that the use of technology should favor a dialogical, student-centered education focused on the development of critical skills. Information literacy, vital in the digital age, is emphasized as a crucial skill for both teachers and students.

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CAPÍTULO 8

Pedagogical practice and the use of educational technologies

Challenges and achievements

Adelson Moreira Santos
Jorge Manoel Adão

The purpose of this text is pedagogical practice, delimited to research on the use of educational technologies, at the State University of Goiás (UEG), specifically at the University Unit of Silvânia — GO, in the Pedagogy and Administration courses, experienced in the period 2020-2021. The theme is justified by the worldwide movement experienced during the so-called pandemic period (2020-2021).

The Novel Coronavirus pandemic, called the Covid-19 pandemic, has affected the world population since December 2019 and has directed education towards technology-mediated education. Thus, it was necessary to reorganize the teaching and learning process, which took place in person, with students and teachers in synchronous time in the same environment, for teaching mediated by digital technologies with asynchronous moments (activities programmed in a virtualized environment) and synchronous (with web conferences via sound and image transmission devices).

Thus, depending on the pandemic and the process of social isolation, necessary according to the health authorities of the States and the Federal District, to prevent the spread of the virus that causes Covid -19, and with the strategy of classes mediated by adopted digital technologies, the present research is justified by the authors' proximity to the issue; since both are professors at the said university and experienced the challenges and achievements with remote classes, circumstantiated by the pandemic. Accordingly, while researchers, concerned about the movement, begin to study the issue, due to the relevance that the results may offer with regard to possible post-pandemic changes, which are expected to occur immediately. The transformations presented by the pandemic, in the sense of education with remote classes, are unlikely to be regressed. In addition, it is important that investigations identify challenges and achievements so that one can plan how to proceed based on this reality. In the case of the university, the object of the case study, since the authors are members of the Nucleus for Structural Development (NDE), they may suggest changes, including curricular changes.

As a problem, "What are the challenges and achievements of the pedagogical practice of the teachers of the Pedagogy and Administration courses at the University Unit of Silvânia — GO, of the State University of Goiás with the use of educational technologies during the pandemic period?" Thus, we aimed to present the challenges and achievements of the pedagogical practice of the teachers of the Pedagogy and Administration courses at the University Unit of Silvânia-GO, of the State University of Goiás with the use of educational technologies during the pandemic period. To achieve the general objective, specific objectives were chosen: (a) to discuss the information society and the use of educational technologies; (b) and, to analyze the pedagogical practice of higher education teachers using educational technologies in the pandemic period.

The method that guided this writing is close to historical-dialectical materialism because of contradiction and mediation, as well as the observation of social transformations. The methodology is identified as an applied, quanti-qualitative research and case study, using a mixed questionnaire prepared

by *Google Forms* and sent by institutional electronic address (institutional e-mail) to the 11 teachers of the Pedagogy and Administration courses at the Silvânia University Unit at the State University of Goiás. The sample of teachers participating in the research was random, considering the return of the questionnaire within eight calendar days from the date of submission. The theoretical scope was in Santaella (2013), Schuartz and Sarmento (2020) Castells (1999), Teixeira (2002) and Moran (2007), among others.

Finally, the present text is subdivided into two subjects: the information society and educational technologies: theoretical analysis; and the pedagogical practice of higher education teachers using educational technologies: empirical analysis; together with some final considerations.

THE INFORMATION SOCIETY AND EDUCATIONAL TECHNOLOGIES: THEORETICAL ANALYSIS

Contemporary society sees changes that occur in commercial and social activities instantly, facts that until the middle of the 20th century took years to assimilate. Nowadays, it takes a matter of hours for the changes to be disseminated and introduced into the routine of many people. The educational field is not left out of these transformations, in fact, many of these, especially the technological ones, stem from the increase in the number of academic students, who, through research, develop and present new solutions to old problems; thus, we are referring to the society that produces and has access to information in an accelerated manner, and that is called, by some scholars, the information society.

The expression "information society" began to be used, in the last years of the 20th century, as a substitute for the complex concept of "post-industrial society" and as a way of transmitting the specific content of the "new technical-economic paradigm". (Werthein, 2000, p.71).

For the author mentioned above, the name of information society is based on the reality that the concepts of the social sciences seek to express and which approach technical, organizational, and administrative transformations, whose "key factor" is no longer cheap energy inputs — as in industrial society

— but the cheap information inputs provided by technological advances in microelectronics and telecommunications — which are available to a large part of the population. As for Gouveia (2004, p. 01),

> The Information Society is based on information and communication technologies that involve the acquisition, storage, processing, and distribution of information by electronic means, such as radio, television, telephone and computers, among others. These technologies do not transform society by themselves, but are used by people in their social, economic, and political contexts, creating a new local and global community: the Information Society.

For this author, this new model of society presented is based on new economic, social, and cultural development resulting from the process of expanding territorial boundaries, but which maintain the principles specific to each nation in economic, political, social, and cultural relations.

Gouveia (2004, p. 01) explains that concepts about the information society originate in the works of Alain Touraine in 1969 and Daniel Bell in 1973, who discussed the influences of technological advances on power relations, identifying information as the central point of contemporary society. Thus, we explain that the definition of information society presents different perspectives and variations from author to author and is not yet a term with a consensual definition.

In this paper we use the concept of information society presented by Castells (2004, p. 225), which assures the "information society as a society and an economy that makes the best possible use of information and communication technologies in order to deal with information, and that takes this as the central element of all human activity".

In this information society, citizens make use of the possibilities that information and communication technologies allow them in all aspects of life, at work, at leisure, at home and in their education. According to Gatti (2016), the use of digital information and communication technologies presupposes the contemporary social context and training conditions that enable proposals

for training in a more in-depth manner. Here, the teacher needs to meet the students' expectations, and in addition to teaching, he needs to learn.

> The resources available in all areas of digital technologies enable individuals to constitute thoughts, seek information, and mature knowledge, even if involuntarily upon arriving at the school space, that person will at some point diverge from what was exposed. If the teacher does not have educational characteristics and a welcoming look, he can probably dismiss a potential student or 'block' their learning process, in the contemporary educational setting what is needed are visionaries professionals willing to go in search of the new and multiply what was disseminated in the classroom, even if at times such thoughts need to be deconstructed (id. ib., p. 169, emphasis added by the author).

Thus, higher education teachers need updates in their didactics, their worldview, and the educational process, so that they can interact with new realities and be able to dialogue with the educational technologies that advance society.

> The power of digital language, based on access to numerous digital media using cell phones, computers and all their peripherals, to the internet [...] with all the possibilities of these media, increasingly influences the constitution of knowledge, values and attitudes, creating a new culture and another informational reality in all spaces of society (Kenski, 2015, p. 33).

The task of teaching needs to go beyond the walls of the physical classroom and enable teachers to expand, through educational technologies, their practice and appropriate, together with the student, new knowledge. For Santaella (2013), the digital revolution is not just transforming communication formats. Among other aspects, his studies point to the permanent need to reflect on the modifications that human beings have been undergoing in contact with technologies, "modifications not only mental, but also bodily and molecular" (*id. ib.* p. 31).

These modifications, which the author points out above, are reflected in the way in which one teaches and, consequently, how one learns, depending on

how educational technologies are used, these can bring teachers and students closer to organized knowledge or distance them in a noisy way.

In Moran (2007), contemporary digital technologies can be used as potentiating tools, which assist in the pedagogical practices developed by teachers in their educational activity, but the competence and ability to insert these technologies have proven to be challenges for their effective implementation.

Based on the technological innovations that society welcomes and uses in its daily lives, Higher Education is challenged to seek the articulation between teaching and learning, encouraging student autonomy; using contemporary forms of transmission and assimilation of educational practices, so that knowledge is obtained through the union of knowledge. For Teixeira (2002, p. 161), "[...] the role of the student, the learner, the subject constructor of knowledge, is of relevant importance in the construction of their autonomy, since they must be co-responsible for constructing results at all times of their academic career".

The search for this usability is configured in the implementation and use of technologies in the practice of higher education teachers, according to Cantini et al. (2006), the impact of technological innovations brings to social, professional, and academic life, especially with regard to teacher training in the face of Digital Information and Communication Technologies (TDIC). These authors understand that teachers are passive in the face of such changes and the incorporation of technological artifacts in the classroom.

They attribute this behavior to the absence of encouragement to encourage such appropriation during their education, and to the lack of technical and pedagogical support in educational spaces. But there is also another factor in this issue: the teacher's own interest. Corroborating this construction, Schuartz and Sarmento (2020) points out that when realizing the transformations that new technologies bring to education, one cannot help questioning the role of the teacher in this digital universe. "It is understood, however, that it does not lose its central role, but that new possibilities are being added to teaching. These possibilities are brought by digital technologies, some hitherto unthinkable" (id. ib., p. 431).

Consequently, we ask what are the challenges and achievements of the pedagogical practice of the teachers of the Pedagogy and Administration courses at the University Unit of Silvânia — GO, of the State University of Goiás with the use of educational technologies during the pandemic? It is the problem that guides our research, and that pervades the teaching and learning process in the search for the use of educational technologies and pedagogical practices.

THE PEDAGOGICAL PRACTICE OF HIGHER EDUCATION TEACHERS USING EDUCATIONAL TECHNOLOGIES: EMPIRICAL ANALYSIS

The present research was applied, quali-quantitative and using the case study technique. For Gil (2017), qualitative research considers the active relationship between the environment and the individual, which generates an inseparable link between the objective of the world and the subjectivity of the subject, which cannot be measured in numbers simply, requires interpretation of the variables used. And, in Bogdan and Biklen (1994, p. 44) we have that the case study consists of the detailed observation of a context or individual, of a single source of documents, or of a specific event.

According to Freitas, Janissek-Muniz and Moscarola (2004), the *Internet* is an enhancer of resources for conducting research, including ours, because it allows greater interaction and reach. Through an *online* questionnaire, it was possible to obtain answers and monitor, in real time, the research data, and thus, to visualize the evolution of the collection and interact with the participants until its closure. The electronic questionnaire, prepared by the technological tool *Google Forms*, allowed us to survey with teachers regarding educational technologies. Specifically, we seek to know what they know, how they use it and for what purposes they do it.

The mixed online questionnaire, created on Google Forms, had 21 closed and 2 open questions, and was sent via institutional e-mail with a delivery time of 08 calendar days, on the date of 02/09/2021, the link to the questionnaire was also sent via the instant messaging application WhatsApp. We use the technological tool *Google Forms*, as it automatically generates the tabulation results, including

graphs, for closed questions. Open-ended questions were addressed with the help of the spreadsheet editor (*Excel*).

Using the guidelines of Bogdan and Biklen (1994) on research that relied on indirect conversation, mediated by technology, with the teachers who accepted to participate in the study and who offered to discuss their performance in the 2021 academic year.

> although individuals doing qualitative research may select specific questions as they collect data, the approach to research is not aimed at answering previous questions or testing hypotheses. They essentially privilege the understanding of behaviors from the perspective of the research subjects. [...] They usually collect data based on in-depth contact with individuals, in their natural ecological contexts (id. ib., p. 16).

We sent an e-mail asking that teachers who felt comfortable and interested in participating in the research presented here would be sent, and to those who agreed, an electronic form containing the questions guiding the research would be sent. This form included the questions regarding training and performance, the challenges he faced in the 2021 academic year, as well as pointing out the achievements that were achieved in his classes during the period.

In the contradictory and historical movement that constitutes reality, for the case study, it is necessary to present the UEG, the locus of research, especially in the observance that it is a relatively new university, and of a *multi-field, internalized spatial configuration with spatial, economic*, and cultural differences, among others. Since some units are more than a thousand kilometers apart and are close to states in the southeastern region and others in the North and Northeast regions, which directly or indirectly influences the constitution of their audience and their course curriculum, in order to meet the demands of the region. State Law No. 13,456, of April 16, 1999, creates the State University of Goiás (UEG) with a multi-campus structure, based in the municipality of Anápolis, was born from the incorporation of the former State University of Anápolis (UNIANA) and 12 other isolated Higher Education Institutions,

maintained by the government. Initially, UEG was present in 39 Goiás cities, with 41 campuses.

According to Goiás (2020), in 2014, this institution had 17,145 students enrolled in its undergraduate courses, 9,301 in undergraduate degrees, 5,956 in baccalaureates and 1,888 in technological programs. In graduate studies, the university has 15 *Lato Sensu* courses and 10 master's and doctorate programs, meeting the specificities of the State and the demands for qualified professionals. The faculty is made up of 2,032 professionals, 97 post-doctorates, 217 doctors, 632 masters, 922 specialists and 162 graduates [Aren't there more recent data?

On January 17, 2020, Decree 9,595 was published, establishing the new UEG Statute, which, among other provisions, promoted the complete reorganization of structures and directives, including the reduction of the number of Campuses from forty-one to eight (Metropolitan, Central, North, Northeast, Cora Coralina, West, Southwest and Southeast), with just one in each region of the State. The remaining thirty-three became university units, linked to the nearest Campus. Also part of the UEG is the Network Teaching and Learning Center (CEAR), which promotes distance education in 16 centers throughout the State (Goiás, 2020).

Among those thirty-three, which became university units, is the Silvânia University Unit of the State University of Goiás, which was created in the form of an autarchy, by Law No. 12,228 of December 28, 1993, and by Decree No. 4,685, of June 1996, called the Faculty of Agricultural, Biological and Literary Sciences — Faculty Priest Lobo. According to Goiás (2020), the Silvânia university unit was integrated into the UEG,

> In 1999, it joined the State University of Goiás by Law No. 13,456 of April 16, 1999, published in the DOE-GO of April 20, 1999. It became effective in 2001, with the Literature course from the University Program for Education Workers — Full Installment Degree, in classrooms provided by the José Paschoal da Silva State College and then on the premises of the Geraldo Napoleão de Souza Municipal College, while the construction of the headquarters was being completed. It was built in the years 1999 to 2002 and its inauguration took place on July 4, 2002, when it ceased to be

called the Faculty of Agricultural Sciences and Letters, to become a University Unit of the UEG — State University of Goiás.

UnU Silvânia serves 13 municipalities, according to the territorial division of the state of Goiás and offers this population training to enhance economic and social growth. According to Goiás (2021), Silvânia was born as Arrayal Nosso Senhor do Bonfim in the year 1774, to house the adventurers who came after the gold that was found in the region on October 5th and became a city with its current name in honor of the family of Vicente Miguel da Silva, hence the name Silvânia.

Currently, according to Goiás (2021), the municipality of Silvânia (GO) has an estimated population of 20,938 inhabitants, 82 km from Goiânia (state capital); 78 km from Anápolis and 160 km from Brasília, it has an area of 2,264,769 km2. It is located in the South of Goiano, with neighboring municipalities: Abadiânia, Alexânia, Luziânia, Orizona, Vianópolis, São Miguel do Passa Quatro, Bela Vista, Caldazinha, Leopoldo de Bulhões, Gameleira de Goiás and Anápolis. The municipality's economy remains one of agriculture and livestock and commerce (the latter on a smaller contribution scale). The municipality has 12 elementary education institutions, and 03 secondary education centers and only one public and state university, the State University of Goiás (UEG), the Silvânia University Unit (UnU Silvânia).

In 2021, UnU de Silvânia presents two active undergraduate courses, Degree in Pedagogy, and bachelor's in management, with 198 students, distributed in 91 for the first course and 107 for the second, accompanied by 12 teachers. These 12 teachers were part of the list of the population of that research, reduced from one, who is one of the authors of the present text. The investigated population was composed of 11 (eleven) professors who work at the Silvânia University Unit of the State University of Goiás**,** in the Management and Pedagogy courses during the 2021 academic period.

The sample, which was chosen at random, based on acceptance and effective response, has 03 (three) respondents with an average training time of 11 (eleven) years and who work as a teacher. The variation ranged from 6 (six)

years (minimum) to more than 20 (twenty) years (maximum) of experience in higher education. These data allow us to infer that current teachers are trained, that the use of digital technologies in their learning strategy had not yet been consolidated, and the lack of knowledge about them and how to incorporate them into their pedagogical practice may even be one of the challenges to be overcome in the use of educational technologies in the specific context of 2020-2021.

The sample identified that 2 (66.66%) of the respondents are pursuing a master's degree, and 1 (33.33%) have completed their master's degree. 1 (33.33%) of the respondents reported that, in addition to teaching at the Silvânia UnU, they work as a teacher in a private institution; and 2 (66.66%) work in activities other than teaching. The sample shows that 2 (66.66%) work as teachers at the UnU in Silvânia with a workload of more than 40 hours a week. We noticed that the interviewees interact with education, either teaching directly at the UnU in Silvânia or in private institutions; and, although most of them are in the process of continuing education, they share their time with paid activities, which, added to the 40 hours a week they work as teachers, can harm their commitment to the teaching process at the Silvânia unit; since, planning and interaction with educational technologies may be underutilized, due to the high load of activities that they have.

We asked the respondents whether the pedagogical practice was changed with the social isolation imposed by the pandemic, 3 (100%) stated that there was indeed a change in their practice, we had the same percentage for questioning: the teaching activity at the Silvânia UEG in times of pandemic presents some kind of impact or change in their professional, personal, or family routine. Thus, we noticed that teaching was abruptly impacted and that these teachers needed to adapt to the needs that were imposed during this period, which is corroborated in the following answers.

We asked what device (s) you have at your disposal for teaching activities in times of pandemic at the Silvânia UEG — the 3 (100%) respondents stated that they have a notebook to adapt and prepare their activities. We asked: do you record classes or produce videos to explain pedagogical content to your

students from the Silvânia UEG? The answer indicates that 2 (66.66%) of the interviewees only produce videos about the topic to be discussed and that they do not record their classes for later consultation. Finally, we asked what technological tools to have you been using in times of pandemic for your classes at the UEG in Silvânia? and, 3 (100%) of the respondents stated that they only took their classes *online* live, with the resources of *Google Meet*, *Zoom*, RNP, Others, which was made available by the UEG. Understanding this set of questions allows us to infer that teachers at the Silvânia University have limited technological resources to adapt their teaching practice during the period in which we are using technologies as a mediator in the teaching process. The conduct of classes in an online-only manner may be an indicator of the lack of knowledge that these teachers have of the educational technologies available.

To close the questionnaire, we presented two open-ended questions, in which the participant had the opportunity to answer with their words. Question one: what were the challenges faced by you in your pedagogical practice during a pandemic at the Silvânia UEG? We had the answers that were grouped by similar answers among the respondents, which corroborate our research: organizing time so as not to work 24 hours a day and adapting classes to non-face-to-face classes; since in person we have the possibility of doing group dynamics, and other actions that we can only do in person. These answers indicate that teachers are overloaded with activities and that they have not yet been able to adapt their pedagogical practice to the virtualized universe, using the available tools and devices. We realized that the underutilization of educational technologies occurs and that we are not motivated for teachers to explore them. From here, we can infer that educational technologies are not helping teachers, a fact that leads us to question the reasons, but I believe we are an investigation for another research opportunity.

For the second open question, we asked what were the achievements you achieved in your pedagogical practice during a pandemic at the UEG in Silvânia? And again, we grouped the similar answers and the result points to the following statements: I learned to use several technological tools and acquired more knowledge about tools for online classes, I became more empathetic with

the students' difficulties. Finally, we realized that the teachers who responded to our research learned, and that continuing education is necessary. Because, as we observed, the teachers learned to use the tools that are only available now at a time of exceptionality and that were not yet in their pedagogical practice.

With this study, we can see that teacher training, who is already in the classroom, in person or remotely, needs to be encouraged to make use of educational technologies in their pedagogical practice and to be able to explore the resources provided by them.

FINAL CONSIDERATIONS

The present study sought to answer the following problem: what are the challenges and achievements of the pedagogical practice of the teachers of the Pedagogy and Administration courses at the University Unit of Silvânia — GO, of the State University of Goiás with the use of educational technologies during the pandemic period? Guided by the objective of presenting the challenges and achievements of the pedagogical practice of the teachers of the Pedagogy and Administration courses at the University Unit of Silvânia — GO. Thus, we were able to investigate the reality that the Covid-19 pandemic inserted in higher education and how we can adjust so that pedagogical practice is reorganized and achieves its purpose of promoting the teaching and learning process.

Carrying out this research, in such an adverse situation, the suspension of face-to-face contact between students and teachers, allowed us to observe the reality that was transformed in a short fraction of time and that required adaptation of all the characters of education — teachers, institutions, and students. In this way, we saw that educational technologies, already present only in our daily lives, are still far from classrooms; including higher education, from where the teachers who will work at other levels of citizen education will come out and that we are alerted to the need for training to be stimulated with resources and devices that can mediate the teaching and learning process in a positive way.

Without the presumption of finalizing in this paper the inquiries about the use of educational technologies in teaching practice, we hope that with the

challenges mentioned — overwork, ignorance of technological resources and devices, as well as the adaptation of activities to reach the student who is not yet used to mediating the learning process with the use of technologies — they will be overcome.

In order for pedagogical practice to continuously stimulate and promote education that brings learning closer and promotes learning, we list the achievements that were achieved in this pandemic context, and that transformed the reality of teachers, and we also expect from students, the knowledge and inclusion of the resources and devices offered by educational technologies and that we have more empathy with students' difficulties, as they may be similar. We believe that we have achieved the objective of pointing out the challenges and achievements in the use of educational technologies.

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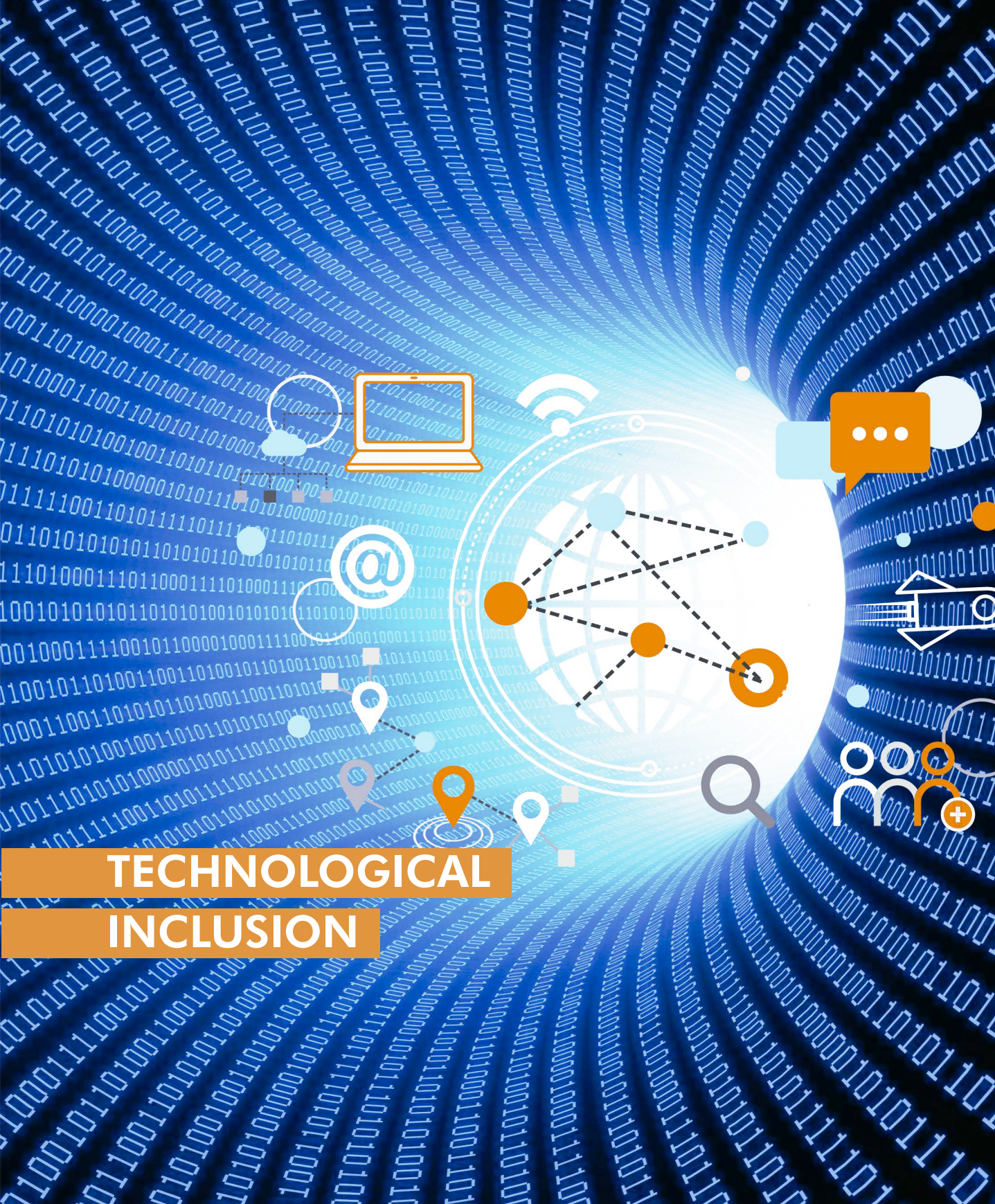
TECHNOLOGICAL
INCLUSION

CAPÍTULO 9

Technological inclusion in youth and adult education

Possibilities and limits of a university extension project

Maria Eneida da Silva
Ivanisia Dias Galvão
Gislene Lisboa de Oliveira

This article is an excerpt from research, whose object is the technological inclusion of students in Youth and Adult Education — YAE, designed to analyze this type of inclusion of students from the 1st to 4th stages of YAE in a public school of Samambaia, Distrito Federal — DF, regarding the use of Digital Information and Communication Technologies — DICT through the implementation of the *UEG Integra* extension project. This project was prepared based on the results of another research, coordinated by professor Gislene Lisboa and entitled Digital inclusion of students in Youth and Adult Education: a possibility during the internships of undergraduate students in Biological Sciences and Pedagogy, which identified a large dropout of students caused, among other reasons, by the lack of knowledge on DICT's use required by remote teaching during the Covid-19 pandemic period. The research was carried out in some public schools in Goiás where YAE is offered and were spaces for carrying out Supervised Internships for academics on those

courses offered in the Distance Education modality by the Centro de Ensino e Aprendizagem em Rede — CEAR of the State University of Goiás — UEG.

During the research project, teacher Gislene Lisboa, the *UEG Integra* extension project was proposed — which took place, specifically, in Goiânia and Distrito Federal — to carry out workshops with students from the 1st to 4th stages of YAE in public institutions to offer possibilities for technological inclusion of these students. During *UEG Integra* arose an interest in carrying out research, taking the opposite path to that which culminated in the extension project, that is analyzing the results of extension activities aimed at the technological inclusion of those students, considering that face-to-face classes they had returned recently and many activities that still required the use of DICT inside and outside the school.

Thereby, the research *The technological inclusion of students from the 1st to 4th stage of Youth and Adult Education at a public school in Distrito Federal* emerged from the *UEG Integra* extension project. Thus, a qualitative investigation was carried out with literature review and field research with indirect observation, mixed questionnaire, and semi-structured interview, whose assess were conducted under the interpretivist paradigm (Yin, 2001; Bortoni-Ricardo, 2008). For this article, we bring an excerpt that includes the analysis of the questionnaires answered by YAE students from a public school in Samambaia, Região Administrativa XII[1], Distrito Federal.

From initial studies, we noticed how important become that research on such subject given that the technological illiteracy affects YAE students and makes them feel so excluded and in the most cases resulting the abandon of

1 Distrito Federal is divided into 35 administrative regions — called RA and followed by Roman numerals according to the order of creation and popularly known as satellite cities — whose physical limits define the jurisdiction of government action for the purposes of administrative decentralization and coordination of public services. Samambaia was created by Law No. 49, of October 25, 1989, and became the 12th Administrative Region by Decree No. 11,921, of October 25, 1989. Available at:
https://segov.df.gov.br/category/administracoes-regionais/ Accessed on: 12 Jan. 2023.

either school and being able to build knowledge and professional ascension dream. Morais (2021) corroborates this perspective by pointing out that digital inclusion in YAE, which, almost always, "[...] is made up of a public already excluded because they do not know how to read, write, or have access to DICT, becomes slower or it may not even happen. And once again this group suffers yet another exclusion, now digital" (p. 3).

Right at the beginning of the activities of the *UEG Integra* project, we were able to observe that one of the reasons why some students dropped out during the pandemic was related to the great difficulties on participating in remote classes as they did not even know how to turn on a computer or opening a link on their cell phones, which made them feel excluded from classes, activities, and school. Since the project proposal was to include these students technologically, the problem of our investigation arose: what are the possibilities and limits of the *UEG Integra* extension project for the technological inclusion of students from the 1st to 4th stage of YAE from a public school in Samambaia, Distrito Federal?

Based on the problem, the general objective was to analyze the possibilities and limits of the *UEG Integra* extension project for the technological inclusion of students from the 1st to 4th stage of YAE at a public school in Distrito Federal; and the specific ones: i) present the historical, legal and theoretical context of technological inclusion and Youth and Adult Education in Brazil; ii) know the profile of students from the 1st to 4th stage of YAE who participated in the *UEG Integra* extension project; and iii) analyze the possibilities and limits of the *UEG Integra* extension project for technological inclusion from the perspective of students from the 1st to 4th stage of YAE at a public school in Samambaia, Distrito Federal.

With this, our research aimed to contribute to pedagogical practices that aimed, mainly, at the formation of critical subjects capable of using DICT in a conscious way, without feeling or being excluded, as demonstrated by the statements of country side school students and Franco's research (2003); Bueno and Gomes (2011); Lourenço, Pelozo, Vieira and Vieira (2012); Santos (2016); Amparo and Furlanetti (2011). Thus, these authors composed the

theoretical basis of the research that, here, brings the results of the analysis of the questionnaires applied to YAE students and which are presented in two sections. The first addresses the concepts of Digital Information and Communication Technologies, and Youth and Adult Education from historical, legal, and theoretical perspectives; and the second section presents the profile of the research subjects and their views on the possibilities and limits of technological inclusion through the *UEG Integra* project.

DIGITAL INFORMATION AND COMMUNICATION TECHNOLOGIES AND YAE: SOME HISTORICAL, LEGAL, AND THEORETICAL NOTES

The word technology is defined by Abbagnano (1999, p. 942) as "the study of technical processes in a certain branch of industrial production or several branches; the same as technique." According to Silva (2016, p. 58),

> Etymologically, the word comes from the Greek "τεχνική" which means technique, art, craft; together with the suffix "logia" which means study; although the meaning is not so restricted [...] From this, it can be inferred that the word technology defines a set of knowledge, instruments, or methods capable of modifying the natural or artificial environment and satisfying human needs.

Thus, the author highlights that several technologies emerged throughout human evolution, such as fire, the invention of the wheel, writing, the steam engine, among others, until reaching the computer and its artifacts. In constant improvement processes, this latest advent has brought terms such as New Technologies, Information and Communication Technologies — ICT and, more recently, Information and Communication Technologies — DICT. According to Maseto (2012), New Technologies refer to information technology, hypermedia, multimedia, distance education tools and other digital languages as pedagogical mediation strategies for the teaching-learning process.

The author argues that ICT is more comprehensive, referring to "[...] telecommunications improvement technologies; from the internet; also,

distance education; mobile and digital devices; as well as high technologies such as Nanotechnology, Biotechnology, among others." (Silva, 2016, p. 58). DICT are integrated into a range of technological bases that enable, through equipment, programs and media, the association of different environments and individuals in a network to facilitate communication between its members and expand the actions and possibilities already guaranteed by technological means. For Benedetti (2023), ICT correspond to technologies that mediate people's informational and communicative processes, for example, newspapers, radio, or television; and DICT also encompasses digital equipment such as computers, digital whiteboards, etc., with the internet being one of the main technologies in this group.

Nowadays, technologies, in general, have brought several benefits to people, such as the speed and possibilities of communication and information traffic, the discovery and treatment of diseases, the development of inputs and improvements in the cultivation of food and the creation of animals, comfort with the use of cars, household appliances, among many others. Therefore, technological inclusion is necessary and constitutes a right for all people so that they can integrate socially and enjoy the same rights as those who already know, use, and benefit from existing technologies.

The social body has developed a lot over the years, but since the 20th century, considering technological development, there has been a great leap in the fields of science, information technology, communication, health, education, among others. Since the school is a social institution that holds teaching-learning techniques and methodologies, mediating the knowledge and critical development of its subjects, training, in this space, becomes very important for the advancement of technologies itself (Silva, 2016). The knowledge provided by school is also necessary for the training of human beings, to the detriment of the use of technology or not.

When thinking about technologies in education, it is necessary to understand that, in this space of knowledge construction, the inclusion of information technology and other DICT can provide students with new ways of learning and technologically include children, adolescents and adults. Given

this, technological inclusion becomes more urgent when students are in Youth and Adult Education, as they are socially and digitally excluded because they do not know or have great difficulty reading and writing.

Thinking about YAE recalls the history of Brazilian education which, since colonization, reflected relations with Europe, characterized by a development dependent on capitalism, social distinction, and domination. This subservience caused centuries of abandonment of national education with an emphasis on training outside the country aimed at the elite, while the less favored worked a lot, earned little, and had their studies neglected due to training, when they had any, that included reading, writing, and counting.

Several popular movements in favor of education and the arts to promote the transformation of Brazilian society, including struggles for the schooling of young people and adults, and which had critical voices such as Paulo Freire, were silenced by the 1964 Military Coup, imposing 21 years of dictatorship in Brazil. However, there were many attempts at continuity, even under the control of the government's iron hands, in the years 1967, with the Movimento Brasileiro de Alfabetização — MOBRAL; in 1969, with the Massive Literacy Campaign; in the 1970s, with the expansion of MOBRAL throughout the country. In the 1980s, social movements emerged, and some literacy projects gained strength, but it was the 1988 Constitution that brought to education the perspective of a good that is the right of all and the duty of the State and the family to be promoted in collaboration with the society.

During this period, more specifically from March 5 to 9, 1990, the World Conference on Education for All took place in Jomtien, Thailand, bringing together 157 countries, including Brazil, which became a landmark for education in the world. There, guidelines for the education of children, young people and adults were established, making universal access to education and the fight against illiteracy an international priority for the next 10 years. In Brazil, in 1996, Law n. 9.394 was enacted, with Diretrizes e Bases da Educação Nacional — LDB, but which dedicated only two articles to YAE, dealing with such an important type of education, which was the subject of discussions and deliberations in a world conference, in a brief and shallow way.

In 1997, another conference became an important milestone in strengthening the rights to access education beyond the right age: the 5th International Youth Conference, in Hamburg, Germany, promoted by the United Nations, which linked adult education to sustainable and equitable development of the planet. At a national level, in 2000, CNE/CEB Parecer n. 11 and CNE/CEB Resolução n. 01 were approved, regulating Diretrizes Nationais para a Educação de Jovens e Adultos. These guidelines established YAE 's own identity by, i) reestablishing the age of 14 for entry into YAE for primary education and 17 for secondary education; ii) assign reparative, equalizing, and qualifying functions to this modality; iii) regulate specific teacher training; and iv) contextualize curricula and methodologies.

Despite this, the State does not invest in YAE as much as in regular education and the right to universal education, which has legal support, is not realized. Youth and Adult Education still suffers from the neglect of the State because it continues to be marginalized by public authorities due to the non-execution of the various public policies aimed at this segment before and after the LDB. Only in the early 2000s did YAE receive benefits from public policies that had already been aimed at regular education for a long time.

Thus, according to Santos (2016), in the 2000s, there was an increase in enrollment in EJA from 3.8 million in 2001 and to 5.6 million in 2006. The 2022 School Census (Brazil, 2023) highlights that, between 2018 and 2022, the drop was 21.8%, reaching 2.8 million registrations in the segment. Another fact that this Census brings is the youthization of the modality, given that, in 2022, for example, around 400 thousand young people left regular education and migrated to YAE. Lázaro (2023, p. 26) reports that

> Studies are underway to understand this complex dynamic that involves decisions by education systems, which exclude low-income students and reduce EJA classes, as well as weighing labor market dynamics, personal motivations, and other factors. Furthermore, EJA classes do not always find schools willing to share their spaces and resources.

This author also points out that, at the end of the 1990s, access for children aged 7 to 14 to primary education had been universalized, but recent data show that retention in the final years is higher among white children and not black ones; and that, between the ages of 15 and 17, young white people attend school 10% more than black people. Another important fact is that "Of the total number of students, only 82% complete elementary school at age 16. The exclusion process takes place at every stage of the journey." (Lázaro, 2023, p. 22). Alongside this contingent, there are adults who in their childhood and/or youth did not have access to or were excluded from the educational process for various reasons, but mainly due to economic and social inequalities.

The authors Amparo and Furlanetti (2011) discuss illiteracy and functional illiteracy in the population over 15 years of age, highlighting that these individuals are already excluded because they do not know how to read and write and are even more excluded from the technological world. Thus, they explain that it is necessary to change the conception of adequate digital inclusion, as, to do so, it is necessary to give people opportunities to have contact with computers and teach them how to use them. Franco (2003) highlights that the public who attend Youth and Adult Education courses do not face the challenge of computers in their work environment, although it is an increasingly close demand due to the need to operate equipment that requires a certain familiarity with technology.

A relevant fact brought by this author is that there is research stating that functional illiteracy has not yet been overcome and that around 65% of Brazilians find themselves in this condition. Regarding technology, around 10% of Brazilians have access to a computer and 6% to the internet and, of this total, 80% are from classes A and B, and are in metropolitan regions (Franco, 2003). Even though the data is from 20 years ago, this is still a reality in a country that has a high degree of technological exclusion, as illiteracy, socioeconomic status and geographic location are determining factors in this process. Even today, actions for the democratization of information technology mostly take place in public schools, but YAE students continue to be excluded from this opportunity.

For these actions to be carried out, Bueno and Gomes (2011, p. 54) emphasize that "ICT must be used with clear criteria and purposes and, sine qua non, with prior teacher training, which should not occur quickly, under penalty of compromising any strategy aimed at overcoming the educational chaos in Brazil". This is because the use of technologies in education does not always guarantee the success of the teaching-learning process, as other conditions and methodologies are required in addition to the comings and goings of computer labs without projects and activities that are significant to the students' reality. This is because the information and communication era has more complex issues and learning DICT can make students not feel socially excluded, which is one of the characteristics of YAE students. In this way, learning to use contemporary technologies favors not only the educational process of these students, but, above all, social inclusion.

Therefore, when studying the technological inclusion of YAE students, we found that bibliographic studies were also confirmed in the field school and account for the large dropout rate of these students during the pandemic. Morais (2021) highlights that both digital and social inclusion are intertwined and, furthermore, they support each other. Complete social integration is not possible if people do not know how to read, write or are unaware of the existence of technologies and, even worse, when they do not know how to use them. Therefore, "[...] it is of great importance that individuals have computer skills, in order to guarantee a better insertion in the world of work and information" (Lourenço; Pelozo; Vieira; Vieira, 2012, p. 2).

This is because school and society are inseparable and, therefore, DICT need to be present in pedagogical practices as a means and not as an end, so that students can realize that these technological tools are present in everyone's daily lives, whether they know how to use them or not: in means of transport, bank ATMs, public offices, at home with washing machines, televisions, microwaves, refrigerators and the computer or cell phone itself. Knowledge of the technologies embedded in this equipment is a priority condition for the social and technological inclusion of people and, in the same way, it becomes essential for their political, social, economic, and cultural participation. In view

of this, we understand that the school is a space that can assist in this inclusion process to provide action in spaces that are increasingly distant from many people today.

According to Amparo and Furlanetti (2011, p. 3),

> [...] it is in the teaching modality of Youth and Adult Education, where it is most difficult to implement digital inclusion and where most attention should be paid, which generates many challenges and discussions. These individuals are already excluded from society because they do not know how to read and write and with the advent of technology, these individuals also become digitally excluded.

That said, the next section presents the results and discussions of what was obtained through observation and the questionnaire, to achieve the research objectives.

TECHNOLOGICAL INCLUSION OF YAE STUDENTS IN SAMAMBAIA, DISTRITO FEDERAL

Initially, the research subjects were administered a diagnostic questionnaire to check how familiar they were with DICT and knew how to use them as tools during remote classes. With this, the *UEG Integra* extension project could be planned, which was carried out through workshops, whose themes were initially thought of by us and then suggested by the students. After authorization from the field school management, the meetings took place on Thursdays, from May 5th to November 4th, 2022, with seven workshops, observed and recorded in a field notebook.

During the meetings, the notes were analyzed, and in the last meeting, a mixed questionnaire was applied to the students to find out if there was, in fact, a positive response in relation to the construction of knowledge about DICT, especially those presented in the workshops. This questionnaire contained 13 objective and 2 subjective questions and was divided into three axes, namely:

i) General data; ii) The *UEG Integra* project workshops; and iii) Teaching mediated by Digital Information and Communication Technologies.

The first meeting with the YAE 1st to 4th stage classes took place on May 5, 2022, and a conversation was held to present the project, understand the students' technological inclusion, and apply the diagnostic questionnaire. During this time, it was identified that only one student had a computer at home, but that everyone had smartphones and they knew how to send and receive voice messages — as they were still literate, but none of them knew how to open a link and follow the access instructions or were able to carry out simple activities such as using bank ATMs and voting machines, for example.

From then on, the initial planning of the workshops was changed, and, for the second meeting, it was proposed that students learn how to use an ATM, including showing them the dangers of asking for help from anyone other than a bank employee; discuss scams on the internet and through phone calls and in the agencies themselves; present the myths and truths about banking transactions through Pix. To this end, the workshop took place on May 26, 2022, with the participation of two managers from a Banco do Brasil branch in the municipality of Valparaiso de Goiás. The students' participation was very good: three of them agreed to participate as volunteers to access the ATM simulators that the managers had brought; four students answered their questions about loans and other situations that were raised by their colleagues during the guests' presentation.

On June 9, 2022, the third meeting took place, the purpose of which was to show how to turn on the computer. The students learned how to connect the cables to turn on the machine and, after everything was ready, they made some slides in Microsoft PowerPoint. On June 14, 2022, the meeting was about how to use Word, type some words, format, spell check, browse the internet, create emails, etc. Some of the students did not feel safe participating, as an increase in Covid-19 cases had been reported in some schools in Distrito Federal, including the field school where classes were suspended.

With this, the next meeting took place on September 8, 2022, when the Palma Escola Program[2] was presented used to support literacy in children, young people, and adults. This program is easy to access, as it does not require reading and students can follow everything through audio and each student carries out the activities in their own time. 4,200 learning activities, 937 words, 1,221 phrases, 54-word categories and 34 texts are available, and is prepared for up to five users per device.

On the 15th and 22nd of September 2022, there was a power outage at the school and the meetings could not take place. Therefore, the project continued until September 29th and, due to the proximity of the 2022 elections, a workshop was held on how to use the electronic voting machine during voting. For this workshop, a printed chart was created for students to take home with the order of positions to be voted in Distrito Federal: president of the Republic, governor, senator, federal deputy, and district deputy; and used the electronic voting machine simulator with step-by-step instructions on how to vote. The simulacrum emitted the sounds of real ballot boxes when candidate numbers were entered, both correctly and incorrectly, so that students could identify these sounds and carry out the requested steps at the time of voting. Just like in the ATM workshop, there was great participation from students, proving that interest is greater when teaching what is part of everyday life, situations that help them understand social issues that surround them.

The last meeting took place on November 4, 2022, after more than 30 days, because, in addition to another project like ours having started at the school, the coordinator who accompanied the workshops went on medical leave. Therefore, we returned to school on that date and held a conversation with

2 4In 2010, IES2 launched a literacy program — Palma ESCOLA based on the MEC table of guidelines and competencies that deals with the 1st Cycle of literacy content. It is a mobile educational program aimed at starting the literacy process for children, young people and adults (applications that include learning activities, fixation, handwriting, games and assessment using content blocks. Works on Smartphones and Tablets — ANDROID with reports learning management in the application itself). Available in: https://www.soescola.com/2016/11/aplicativo-palma-escola.html Accessed on: 20 June 2022.

the students, reminding them of all the workshops held and the importance of accepting the new, as there was resistance from some students to *UEG Integra*. It was found that many students who participated in the workshops dropped out of school due to the changes to YAE classes, imposed by Distrito Federal government, which transformed them into multi-stage classes, a grouping of students at different stages of literacy. This change was a limitation in achieving the research objectives.

The establishment of YAE classes in multi-stages in Distrito Federal took place from the second semester of 2022 and, therefore, the workshops that were from 7:30 pm to 10:00 pm were moved to 7:30 pm to 8:30 pm. Before the change, there were four classes of 1st, 2nd, 3rd, and 4th stages; then, a 1st and 2nd class together and, in the same way, another with 3rd and 4th stage students. This meant that student dropout was higher than during the pandemic period and when face-to-face classes returned. Students who did not drop out claimed that while it was already difficult to learn from students at the same stage, after the new configuration it became almost impossible.

Legally, at the district level, the constitution of these multi-stage classes is justified in cases where the number of students does not correspond to that established in the Secretaria de Estado de Educação do Distrito Federal — SSEDF (Distrito Federal, 2021), triggering very large classes. small or the non-occupancy of most rooms by EJA students at night. At the federal level, Resolution n. 1, of May 25, 2021 (Brazil, 2021), established Operational Guidelines for the Education of Youth and Adults in aspects related to their alignment with the Programa Nacional de Alfabetização — PNA (Brazil, 2019), to the Base Nacional Comum Curricular — BNCC (Brazil, 2017), and Distance Education for Youth and Adults.

With this, we can see the government's disregard for such an important type of education for those who were unable to complete their studies at the appropriate age, for various reasons. It is a portion of the population that has its rights denied and is forced to abandon school after returning in the hope of finally completing basic studies and, perhaps, continuing with school and academic life.

Given this context, the questionnaire was applied to only 16 students to find out their opinions about the impact of the workshops on their lives. However, few were able to answer the 15 questions, because they did not participate in all the workshops and, in some cases, they only participated in one. Regarding Axis 1 General Data, it was possible to outline the profile of YAE students: firstly, 13 were female and 3 were male, a percentage of 81.25% and 18.75%, respectively. Because of this difference, it becomes important to discuss the issue of gender as a constituent of the subjects' identity, as well as the social construct related to the daily reproduction of roles in instances, practices and spaces, including schools. Thus, Louro (2014, p. 29) highlights that

> By stating that gender establishes the subject's identity (as well as ethnicity, class, or nationality, for example) we intend to refer, therefore, to something that transcends the mere performance of roles, the idea is to perceive gender as doing part of the subject, constituting it [...] From this perspective, it is admitted that the different institutions and social practices are constituted by genders and are also constituents of genders.

Given this, most female students in the classes investigated denotes a historical process of school exclusion of women of regular age who return to YAE to try to complete their studies. There may be several reasons for the exclusion of these students and the most common are family responsibilities assumed at a very young age, such as marriage and raising children in a patriarchal society that places this responsibility on women, even though they also work outside the home. With this, the feminization of YAE reveals that society still reduces women, especially those from the poorest classes to the space of home and work, denying them the right to education and professionalization for the world of work.

The simple average age of the research subjects is 47 years for males and 45 for females, characterizing the adult population who, in addition to studying, take on other social roles in the family and at work. Of the total number of responding students, 5 students indicated that they do not work and another 5 that they do; 2 students marked the option that they work; and one student

and one student did not select any of the options presented (work: yes or no; sporadic work; retired/pensioner). Thus, 43.75% of respondents work and study; 31.25% only study; and 12.5% did not select any of the options indicated.

With these data, it is possible to infer, as does Tombolato (2005), that the working day associated with daily study provides students with overload, causing tiredness, fatigue and other health problems. According to Caladais, Andrade and Lipp (2003), students with extended working hours are more likely to become ill due to excessive energy expenditure to deal with the stressful elements of work and school. These two authors researched the effect of work and study on the health of young adults and young adults, respectively, which allows us to state that these effects are even greater in our subjects, considering their average ages. It can also be inferred that the double shift can trigger difficulties in learning digital resources that are important for the technological inclusion of YAE students due to physical and mental stress.

Regarding Axis 2 The workshops of the *UEG Integra* project, the number of responses regarding what they were able to learn in the workshops was slightly different from what was expected, given that only 7 students participated in all the workshops; 2 did not participate in any; 2 others, just one; 2 were in two workshops; and 3 students participated in 3 workshops. When analyzing, therefore, the responses of the 7 students who participated in all the workshops, we have what is shown in Table 1.

Despite having attended all the workshops, few students noted that there was considerable learning, to the point of saying that they had not changed anything in their lives regarding DICT. The studies by Caladais, Andrade and Lipp (2003) and Tombolato (2005) allow us to infer that stress factors and illnesses caused by balancing school and work can intervene in students' cognitive abilities, with serious implications for the teaching-learning process. Regarding the workshops considered most interesting, subjective question n. 7 of Axis 2, the students responded that they were the ATM and its functionalities and the electronic voting machines.

Table 1 — Responses from the 7 EJA students about the official *UEG Integra* project

Axis 2 Questions	Options chosen	Number of respondents
3. Have you considered the classes	Productive	1
	Great learning	3
	I didn't understand a lot	2
	I didn't understand anything	1
4. Your relationship with digital technologies after classes in the UEG Integra project	It has improved a lot	3
	Changed a little	1
	Nothing has changed	4
5. Regarding the cell phone, your familiarity with this device	It has improved a lot	2
	Changed a little	2
	Nothing has changed	4
6. Regarding the computer, your familiarity with this device	It has improved a lot	2
	Changed a little	2
	Nothing has changed	3
7. Of the classes attended, what was most interesting to you?	About the ATM and its features	7
	How to vote in electronic voting machines	7

Source: Prepared by the authors (2022).

A student's statement, right after answering the questionnaire, was very significant as possibilities for the technological inclusion of the class with the project. The student told the project participants and the class that the ATM workshop gave him, for the first time in his life, autonomy in using this equipment to withdraw his retirement. Even the 7 students who did not

participate in this workshop, when answering subjective question no. 15 of Axis 3 What would you like to have learned that the project team didn't teach you? mentioned the ATM.

Therefore, the testimony of those who participated in this workshop and those who did not participate reminds us of what Nazareno *et al.* (2006, p. 13) when they state that "Digital inclusion is the process of technological literacy and access to technological resources, which includes initiatives to disseminate the Information Society among the less favored classes [...]". Thus, our thesis that the technological inclusion of EJA students may be capable of providing social inclusion and the historic rescue of rights long denied to these socially and digitally marginalized subjects becomes strengthened. In Axis 3 of the questionnaire, responses about the use of DITC for regular classes were practically unanimous, as shown in Table 2.

As for the students who participated in a few workshops, learning was much lower and both *UEG Integra* and the research were unable to successfully achieve the proposed objectives. The lack of attendance, which we attribute to what Caladais, Andrade and Lipp (2003) and Tombolato (2005) discuss, as well as the adoption of multi-stage classes by SEEDF, greatly discouraged students from studying together with colleagues, whom they considered to have more knowledge, which caused great evasion. Thus, when the questionnaire was administered, many students indicated little or no participation in the workshops, compromising the extension project proposal, as well as its evaluation.

For Amparo and Furlanetti (2011), it is precisely in YAE that it is most difficult to achieve technological inclusion and it is where most attention should be paid, which generates many challenges and discussions. With this, we can affirm the need for projects such as *UEG Integra* to help teachers to include their students technologically, in addition to the fact that these projects must be organically built for one or two academic years, reconciling the course's regular classes with digital inclusion workshops.

Table 2 — Responses from YAE students about the use of TDIC in regular school classes

Axis 3 objective questions	Options chosen	Number of respondents
8. Do you believe that classes would be better with regular use of the technological devices present in the school?	Yes	13
	No	1
9. Do you believe you should take more classes in your school's computer laboratory?	Yes	13
	No	1
10. With classes, do you think you will have more desire to learn about using computers and cell phones?	Yes	14
	No	0
11. If more technology were used in the classroom, do you think you would be at a more advanced stage of knowledge?	Yes	12
	Maybe	2
12. Classes using a cell phone or computer to study the subjects	Makes your learning easier	13
	Makes your learning difficult	1
13. Would you recommend these workshops to other schools that have YAE?	Yes	13
	No	1
14. Level of satisfaction regarding the project/workshops	Very satisfied	7
	Satisfied	7

Source: Prepared by the authors (2022).

In this way, when an extension project is prepared — for any stage, level, or modality of teaching — that is procedural and organic (Reis, 1996), so that students have the opportunity to experience the extension proposals which, in addition to enabling construction of knowledge, are capable of providing Higher Education teachers and academics with the learning of knowledge shared by Basic Education students and teachers.

CONSIDERATIONS

The theoretical and empirical studies of this research were centered on the technological inclusion of students from the 1st to 4th stages of EJA at a public school in Samambaia, Distrito Federal through the *UEG Integra* extension project. It was possible to notice that the research subjects have access to state-of-the-art cell phones, but they use them restricted to voice messages on the WhatsApp application, with other possibilities of the tool being underused, keeping these users as a kind of supporting actors in technological inclusion. by cell phone use. As for the computer, only one student has this technology at home, but he didn't even know how to turn on the machine, which makes the possibilities of inclusion using this tool, even at school — given that the first semester of 2022 was left without a computer laboratory and when it was renovated, it remained unused due to lack of internet — with several limitations.

The workshops offered by the project were considered useful by some students and not so much by others. The one about using bank ATMs was highlighted by the subjects as the most useful because it helped them solve practical problems in their daily lives. This knowledge has inserted them technologically to have autonomy and feel like citizens of a society that excludes them because they do not know how to read and write, but that they feel part of it when it comes to, for example, going to the bank and being able to use the ATM without depending from family members or strangers who could cause them serious financial and even emotional harm.

The other workshop identified as useful for the students was about the use of the electronic ballot box, which was another piece of equipment capable of making them citizens to exercise their right and duty to vote without the

embarrassment of needing assistance in a space of privacy and the right to secrecy. Once again, technological inclusion was able to provide autonomy and freedom to research subjects. Therefore, these two workshops are highlighted as possibilities for technological inclusion through the actions of the *UEG Integra* project.

The limits highlighted by the research are mainly linked to student attendance, school dropout due to the implementation of multi-stage classes as an impediment to participation in the project, as well as the resistance of some to participate in workshop activities. These limits were not only in relation to technological inclusion, but also to student learning, whose negative reinforcement finds resonance in the law of multi-stage classes. Another limit found by the research was the fact that *UEG Integra* was not designed for at least one or two academic years so that students would have enough time to learn everything that was proposed and whatever else they wanted to understand.

Other results of this study allow us to infer that YAE teaching is based on an Education based on neoliberalism, whose intention is to promote to these subjects a teaching-learning process that meets the interests of the job market, that is, learn the minimum to obey well and do what needs to be done, with low wages and high production.

Therefore, more than teaching how to use DICT, YAE students need procedural and organic projects that provide them with meaningful and omnilateral learning, and not just processes with information that do not give real meaning to any subject covered, which, here, is the technological inclusion. This means that this inclusion needs to aim, also and above all, at digital literacy and multiliteracy among EJA students and at other stages, levels, and types of education throughout Brazil.

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CAPÍTULO 10

The production of meaningful learning in history teaching, meeting the requirements of BNCC and law 10.639/2003

Jeferson Carvalho Mateus
Francisco Ramos de Melo
José Leonardo Oliveira Lima

Promoting quality education, which brings students meaningful learning, is not easy, as it does not depend only on the teacher or the student, but on a set of factors that need to come together in favor of this education. Given this context, the research focuses on the use of technology to create meaningful learning contexts in History teaching.

It must be considered that, for a long time, educational institutions developed banking education, in the sense that the teacher taught the contents that should be assimilated by the students, without them contesting or participating in the production of knowledge and there was still a focus on a single source of learning, which were textbooks. Social changes, however, impacted life in society and, consequently, also the way we teach and learn, and this traditionalist teaching no longer meets social demands, making it necessary to teach and learn in another way, through exchange of knowledge, diversification of methodologies, sources of knowledge and a student who effectively participated in the production of knowledge (Klausen, 2017).

It is in this context that Ausebel's theory of meaningful learning (1982) is cited, which has become popular throughout the world and which focuses on the importance of students' prior knowledge being valued, in order to give rise to new mental structures that enable discoveries and rediscoveries of new knowledge, making those who teach and those who learn, have greater pleasure in the teaching-learning process, which becomes more effective.

In History teaching, the proposal of meaningful learning can promote new learning contexts, especially in the face of a subject that, for a long time, was seen as excessively theoretical and that is treated by many students as unnecessary, as it only deals with themes from the past. , often with no connection whatsoever to the current context. It is believed, therefore, that using technologies such as computers and the internet, for example, it is possible to use and value the knowledge that students already have and give rise to new knowledge, making them more participative, interested, stimulating the ability to research and criticality thereof within different contents of History teaching.

In view of the above, the research problem is: how is it possible to use technologies in the construction of meaningful learning by working on the theme of black people and people of African descent within the teaching of History, following what is proposed in the National Common Curricular Base (BNCC)? Therefore, the general objective of the research was to analyze how technologies can contribute to creating meaningful learning contexts in teaching black and Afro-descendant themes, according to BNCC curricular parameters and propose a process (guide) for applying technologies in classes to teach the content of the topic to high school students.

The methodology used was bibliographic and documentary in nature. Bibliographic, as the bibliographic review was based on books, articles, academic works and works that discuss the production of meaningful learning, the teaching of history and other themes proposed in the research, being explanatory in nature. Documentary, as it involves research in the National Common Curricular Base, with the aim of understanding the objectives of this legislation for teaching history, and specifically with the theme of black people in the 3rd year of high school. Thus, History teaching content will be proposed to students

in the 3rd year of high school (black culture and its influence in Brazil), using the computer and the tool of virtual museums.

PRODUCING MEANINGFUL LEARNING

The theory of meaningful learning (AS) was developed by David Ausubel in 1963, with numerous contributions from authors such as Joseph Novak and Helen Hanesian later. It was the work "The Psychology of Meaningful Verbal Learning", and, in 1968, the book "Educational Psychology: a cognitive view" that gave rise to the first discussions and ideas around meaningful learning, opening doors for the creation of this theory. Three decades later, in 2000, Ausubel published the work The acquisition and retention of knowledge: a cognitive view, in which he reaffirmed his initial theory with very few changes (Beber; Pinto, 2017).

Beber and Pinto (2017, p.02) states that the learning theory created by Ausubel has a cognitivist nature and its main objective is "to make plausible and useful inferences about the mental processes that intervene between input and output and about what we understand as meaning ", that is, the relationship that the individual develops with the world outside them has importance and meaning in their formation, which is a dynamic process.

When there is an educational intervention process, there must be a substantial change in perspective, covering not only knowledge, but also knowing how to do, not just learning, but learning to learn and for this, the educational action must incorporate itself a set of procedural legalities. In this sense, Pelizzar (2003, p.04) states that it is necessary to start from the student's level of development to develop educational action, in which the student's prior knowledge needs to be explored, giving rise to new cognitive schemes, which is the sum of this cognitive competence and the prior knowledge that the student has that indicates the level of development of that student.

The production of significant learning in the school space happens, according to Pelizzar (2002), when new content is incorporated into the student's knowledge structure and when it starts to have real meaning for him, based on other knowledge he already possesses. . This requires teachers to produce

more interesting and dynamic classes, so that the acquisition and production of knowledge does not become something mechanical and repetitive, "since this incorporation and attribution of meaning is less produced, and the new content passes to be stored in isolation or through arbitrary associations in the cognitive structure" (Pelizzar, 2002, p. 2).

It is necessary to treat the student as a historical subject, as someone who has rights, interactions and everyday relationships, who is building their identity through all these activities and situations. Thus Ausubel (1978) states that the basis of the significant learning process is the relationship of new knowledge with the information and knowledge that the student already possessed, thus creating a non-arbitrary and substantive (non-literal) relationship.

LAW 10.639/2003

In 2003, law 10.639/03 defined that Brazilian educational institutions should implement the study of Afro-Brazilian and African history and culture in their curriculum, so that educational institutions should organize themselves to teach new content, contributing, thus, to disseminate the culture of black men, fighting against prejudices and different forms of discrimination and developing quality pedagogical practices that include African influences in the student's daily life (Brasil, 2003).

According to Lima (2016, p.12):

> The Federal Government established Law no. 10,639/2003, which makes the teaching of African History and Afro-Brazilian Culture mandatory in all primary and secondary schools. We know that such laws will not come to fruition and will only come into effect if teachers and students have access to training on racial issues in education, bringing to classes content relating to the history of Africa and African Brazil, fulfilling our great objective as educators, which is "to reflect on racial discrimination, value ethnic diversity, generate debates, encourage values and behaviors of respect and solidarity".

Therefore, it is necessary to implement the law as a kind of historical obligation for the entire society to know, disseminate and value the culture

of black men in the school space, which ends up generating residues for the entire society.

The implementation of Law 10,639/03 at school is a social obligation, and is carried out by teachers, who have knowledge of the objectives and importance of the law, and even if its implementation is fraught with obstacles, it is possible, as it is legislation whose objective is to ensure the construction of a pedagogy of diversity, combating prejudice and racial discrimination, and for the National Curricular Parameters (PCN) of history and geography:

> Teaching and learning are initially focused on activities that enable students to understand the similarities and differences, the continuities and transformations in the social, cultural and economic way of life in their locality, in the present and in the past, through reading different human works (Brasil, 1997, p.49).

This is why it is important to bring the content of Afro-Brazilian and African History and culture to the classroom, enabling the acquisition of knowledge and reflections necessary for the construction of new citizens, reflecting on racial discrimination, valuing ethnic diversity, enabling the construction of debates, stimulating values and behaviors of respect and solidarity that are so necessary for society.

THE CONSTRUCTION OF MEANINGFUL LEARNING THROUGH THE USE OF TECHNOLOGY IN TEACHING HISTORY

The BNCC presents content relating to the skills and abilities to be developed among students, which aim to give them greater autonomy, critical capacity, understanding of the environment in which they live, among other possibilities (Camargo, 2018). Thus, a study of the BNCC was carried out seeking all aspects that involve the issue of Black people and people of African descent and that are implicit within these skills and competencies, as well as presented in appendix E at the end of this research.

There are different types of skills and abilities to be built from different content and classes to be developed within the 3rd year of high school, with the

concern of making the student critical in relation to the history, culture and social participation of black people. in Brazil and how the situation of black men in the country is currently characterized, given the sociocultural inequalities that are still so strong throughout the country. The lesson plans (contained in the general plan of appendix A) were therefore concerned with dealing with the theme of black men and developing the student's critical capacity in the face of these themes. Alves et al (2020) state that the school needs to have this type of positioning, since:

> Relinquishing the school's task of working with various motor and expressive stimuli limits the student's ability to promote meaningful learning, which motivates them to seek new knowledge and skills that contemplate the formation of an autonomous citizen capable of acting consciously. and effective in different communicative circumstances (Alves, *et al.*, 2020., p.04).

In this sense, there was a concern to define themes, as well as activities that would lead the student to reflect on the issue of black men and the importance of this debate within society, using the knowledge they already had and acquiring new ones. Themes to be covered within the lesson plan were defined: Colonization and decolonization of Africa; Black culture in the 21st century; Racism, prejudice and intolerance; Black people in the Brazilian job market; The remains of slavery in Brazil.

These themes were selected because they compile the history of black people, from the moment they arrive in Brazil until today, when they still experience remnants of prejudice, racism, slavery and social inequalities that are still prevalent today. so strong in the country. According to Munanga (2018, p.01):

> […] and all Africans transported to the Americas through Atlantic trafficking between the 16th and 19th centuries, around 40% of them had Brazil as their country of destination. According to the results of the last population census carried out by IBGE in 2010, the black population, that is, black and brown people, today constitutes around 51% of the total population, that is, 100 million Brazilians in absolute terms.

In such a context, the student needs to know the history of the black man, how it was constructed in Brazil, the elements that acted on it, what are the remnants of processes such as slavery and the abolition of slavery, how Brazilian society is configured today in terms such as economy, work, income, among other aspects that involve black men. Thus, there is the possibility that the student will become more critical in relation to the society of which he is a part, using prior knowledge to understand in more depth the reality, history and culture of black men, giving rise to significant learning.

The next step was to define the objectives to be achieved in the class and the following objectives were defined:Objetivo geral: Analisar como as tecnologias podem ser utilizadas dentro do ensino de História, produzindo uma aprendizagem significativa em torno do proposto na lei 10.639 de 2003 e com base nas propostas da BNCC.

Specific objectives: Draw students' attention to the possibilities that technology offers in their learning and development; Lead the student to understand how it was structured, the reality currently experienced by black men; Encourage students to look at the topic of black culture and the need for its knowledge and appreciation; Instill the student's critical research capacity, so that he uses the knowledge he already has on the topic of black men and is able to acquire new knowledge; Develop activities that value the knowledge that the student already has regarding the history and culture of black men; Develop the ability to use different sources for learning development; Stimulate interaction, critical capacity and the habit of research among students; Comply with the proposals present at BNCC for the development of skills and competencies for secondary education within the area of human sciences, which includes the subject of History.

Such objectives must have a direct connection with the pre-defined skills and competencies within the BNCC, as they involve the construction of the student's perspective on the configuration of Brazilian society, social inequalities, the ethnic characteristics of the people and how they influenced the construction of situations of racism and prejudice, how they are configured today and how these and several other elements are present in their daily lives. Even if the

student has little knowledge about African culture, the history and reality of black people in Brazil, what they do have can be enhanced, as proposed by Moreira (2012) when stating that significant learning is expressed by symbolic ideas that interact in a substantive and non-arbitrary way with the knowledge that the student already has, which increases their interest in knowledge and develops in them a greater willingness to learn, as they feel that what they know is valued and that the knowledge acquired can also be useful in their day to day.

With the clarity of the objectives and skills to be developed, a study of the technologies that could make up the activities proposed in the lesson plan began. The internet was the main resource used, as through other technologies it served as a tool for students to have access to different sources of information and resources that helped in their learning.

It was proposed to use a computer/cell phone as a vehicle to access the internet and, from these resources, access content, videos, graphics, among other tools that could enable the development of the skills and competencies already mentioned. Using computers and cell phones, students can have access to games, content, discussions and various other types of resources in which different content, skills and competencies are worked on and thus, the proposal is that students could use other languages and sources of information, instead of just adopting the textbook as the only source of teaching. Such diversification of materials is important to work with students in different languages, getting them to interact with different sources of information and how each of them deals with the same topic in different ways.

The selection of technologies followed a planning process, which took into account the objectives of the classes, as well as the characteristics and needs presented by the students, taking into account the environment in which they live, the difficulties they have and the skills and competencies desired. to form. In this context, the guide (attached) produced in this research sought to exemplify in different ways how it is possible to use different technologies to work with different themes, based on different types of approaches, which would increase student participation in the production of knowledge, while also valuing what he already knew.

The next step is the use of the computer laboratory so that students can have contact with technology, as well as MAN's works. Meaningful learning does not, however, involve the accumulation of facts, it is a provocative way of promoting change in the student's behavior, as well as enabling the increase in knowledge, but above all, the change in the student's attitude towards the acquisition and production of this knowledge. Therefore, the student, more than having access to these works, needs to be able to reflect on what they mean, on the sociocultural context they represent and the importance of art as an element that represents the history of black men over time, this which becomes much more accessible through the use of technology.

In this stage of visiting the MAM virtual museum, after selecting the works made by the students themselves, a discussion circle will be created, so that these works are presented and the students can express the prior knowledge they have around the theme portrayed within of the image, as can be seen in Appendix C, which contains an example of some images contained in MAN and other virtual museums that can be used in History classes to work on different themes and not just about black men.

The use of computers/cell phones was proposed in several activities, one of which allowed students to access maps in which they reflected on the slave trade, the arrival of black people and the presence of black and brown people in Brazilian territory (as exemplified in appendix C) , thus learning from sources of knowledge other than the textbook and from an interesting resource that is thematic maps.

It was also proposed that students carry out research on the internet, using computers and cell phones and, later, a presentation on black culture over time in Brazil, in order to demonstrate how these people influenced the culture and characteristics of Brazilian society and as today, this culture is treated within the country, instigating their critical vision, leading them to reflect on the influence of black culture among Brazilians, on issues involving prejudice and intolerance and strengthening the knowledge they already have.

The use of graphics accessed via the internet is also (exemplified in appendix C of this research) and can be done either with cell phones or computers in

the computer laboratory. Students should be encouraged to research graphs on employment, work and income (as exemplified in appendix C) that make a comparison between black, white and brown people, seeking to explain such data, also, from theoretical references, be it books, articles , magazines, newspapers. Thus, more than statistical data, it is expected that they will be able to understand how such data were constructed and how they reflect the socio-historical reality of the country. Graphics are elements present in different media, mainly books, magazines, newspapers and students do not always pay due attention to them, but their contents can make learning easier and more interesting and if they are used in a contextualized way with the topics covered, learning becomes even easier. Technology can help students in this process, as creating graphs and accessing them is much easier with the help of a computer.

It was also proposed that students use the internet to search for reports that dealt with situations of prejudice, intolerance and inequalities involving black people and several examples of this type of report can be viewed in the guide in appendix C at the end of this research. With this information in hand, a discussion circle was held, in which each fact was presented and the students were able to have contact with information about laws and public policies that deal with the proposed issue. The idea of meaningful learning is that new information is presented to the student, which makes it easier to apply knowledge in more complex situations. Therefore, we first sought to make the student aware of situations involving prejudice and inequalities against black people. and which are very present in Brazilians' daily lives, so that, later, other topics such as laws, public policies, issues involving human rights would be presented to them, debating the topic in more depth.

An interactive class was also proposed, in which, firstly, the theme "quilombos" was contextualized and, subsequently, an interaction was defined, via the students' WhatsApp group, with residents of areas with quilombo remnants. The proposal is that technology be used as a vehicle of communication, in which students develop an investigative dialogue with these people, getting to know their history and reality better and strengthening their knowledge. The use of WhatsApp acts as a cognitive instrument that can help students learn in

a more meaningful way and the fact that this tool is present in students' daily lives can make them have greater interest in the activities carried out.

After carrying out activities portraying different themes (Colonization and decolonization of Africa; Black culture in the 21st century; Racism, prejudice and intolerance; Black people in the Brazilian job market; The remains of slavery in Brazil), students were asked to build a map conceptual, either using some type of program available on the internet (which can be accessed via tablet, computer or cell phones), or whoever had greater difficulty could be helped by colleagues or the teacher himself to build it via Word®.

Once the activities were defined and carried out, the forms of evaluation of the proposed activities were defined, with the aim of monitoring the students' performance in each activity, the acquisition of different knowledge, their ability to research, express themselves, to use the knowledge they already possessed to acquire new ones and how such knowledge was assimilated into their practice. In order for the teacher to know what the student has learned, he needs to request what he has assimilated, that is, evaluate his knowledge and this knowledge, when developed in a meaningful way, makes the student able to transfer it to other learning. Thus, the students were evaluated differently in each activity, whether in the way they expressed themselves, in their ability to communicate and establish critical thoughts, in their investigative stance, so that they were able to use the knowledge they already possessed to build new others.

FINAL CONSIDERATIONS

The research showed that there are numerous discussions around the process of constructing meaningful learning and that even with the variations, they all indicate the need to value the student's prior knowledge so that new mental processes are constructed and from these new knowledge emerges that are valid in your daily life.

In the specific case of History teaching, meaningful learning requires new dynamics from teachers, especially because many classes are marked by an excess of theories, which takes the student away from learning and makes classes monotonous and repetitive, meaning that not everyone enjoys this. discipline, nor

have good results in their learning process. In this context, technology emerges as an important tool, as it is so close to students, it draws their attention and can assist in the process of acquiring and building new knowledge.

It became evident the infinite possibilities brought by technologies, be they computers, cell phones, internet, games, digital materials, among others, for student teaching and learning, however, that technologies alone do not generate learning, but the way in which they are proposed and used is that they indicate positive results to the teaching-learning process, therefore, the proposal of the guide for using these technologies, as a way for teachers to reflect on how they can be inserted in the classroom, how they should relate to the contents and, mainly, place students as protagonists of the production of knowledge.

The research found limitations, mainly in the difficulty of direct contact with teachers and students as a way of evaluating the use of technologies in teaching History in favor of meaningful learning and therefore the research could be, in the future, complemented in a practical way, evaluating the results the application of lesson plans, the work guide and allowing the construction of new knowledge on the topic covered.

The discussions held made it clear that it is possible to put meaningful learning into practice, as long as the teacher proposes to use different teaching tools and methodologies, which values the student's knowledge and brings their experiences and knowledge to the classroom and with this, the research contributed socially and scientifically by highlighting how different types of technologies can be inserted in the classroom, in a creative, contextualized and interesting way for the student, making them active in the production of knowledge, but without devaluing what they already know and in this way, producing much more meaningful learning.

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CAPÍTULO 11

Analysis of the electronic legal process system implemented in the brazilian labor court

An empirical study

Ana Carolina Martins Severo de Almeida
Francisco Alberto Severo de Almeida

Information technology in procedural management is a reality that the Judiciary has been facing in recent years through the use of the Electronic Judicial Process, introduced into our legal system by Law No. 11.419/06, which has brought significant changes regarding the efficiency, speed and transparency of judicial provision. The changes in procedural management promoted by the Judiciary are aimed at improving the governance of the judicial system, with a focus on credibility, accessibility and speed, as well as reducing the inefficiency of procedural execution through the use of technological innovations. The reasonable duration of the process is a fundamental right provided for in article 5, item LXXVIII, of the Federal Constitution, so the state must adopt management techniques capable of enabling the proper flow of procedural acts.

However, without a doubt, the electronic judicial process has brought benefits to procedural dynamics. However, it should be noted that the problem of the judiciary is not limited to the processing of cases, but above all to the length of the trial, as points out:

> [...] the Judiciary's biggest problem is not the length of time it takes to process cases, but the delay in judging them. 43 million cases are awaiting judgment throughout the country, according to recent data from the National Council of Justice (February/2008). A case in the trial phase is not 'being processed'; it is just waiting to be judged. It's as if 1/5 of the Brazilian population were waiting in line for a court decision. In these cases, the procedural bureaucracy, the north to be tackled by the virtual/digital process, is of no relevance, as it has largely been overcome. Therefore, once the obstacles that disperse the process over time have been solved, with the intended agility of virtualization, without doing so, the obstacles that hinder the swift delivery of justice will be solved, culminating in the judicial act: the decision. [1]

In this sense, it is essential to understand the repercussions of this implementation on the time it takes to process court cases, given the dilemma that the slow pace of justice is one of the biggest obstacles in Brazilian justice. Although it is only a means, the Electronic Judicial Process has brought about significant changes in court management. There has been a real revolution in the way the process works, which should correspond to a review of traditional routines and practices and an adaptation to the new reality. Therefore, the guiding object of this scientific investigation is the following research question: what is the social and legal dimension of the implementation of the Electronic Judicial Process as a governmental public policy action? Thus, this study will seek, through field research, to validate the premises of the *PJE* — Electronic Judicial Process and its dimensions of analysis related to the computerization of the judicial process, Public Management and Procedural Legal Governance.

1 OLIVEIRA, Alexandre Vidigal de. Processo virtual e morosidade real. **Migalhas,** [*S. l*], n. 5759, 14 mar. 2008. Migalhas de peso. Available at: https://www.migalhas.com.br/depeso/56377/processo-virtual-e-morosidade-real. Accessed on: 15 set. 2023.

THE TIMELINE: FROM THE LEDGER BOOK TO THE ELECTRONIC JUDICIAL PROCESS

In the not-so-distant past, all judicial activity was carried out by means of handwritten notes, evolving with the use of stamps and/or typing. At that time, the routine of court registries was entirely manual, and everyone had their own way of proceeding and complying with the orders issued by the magistrates. At the time, when cases were initially distributed to the courts, they were registered in the old Ledger Book and given a sequential number. In this book, the names of the parties, the date of distribution, the type of action and the name of the lawyer or public defender were recorded in alphabetical order.

The initials were then filed by a designated server who had the task of attaching the cover, the color of which corresponded to the nature of the case; numbering the pages in the top right-hand field, initialing them; making a file and sending the cases to the court director for a review of the work done so far. Once the filing form had been checked and issued, duly signed, the case files were sent to the judge for analysis — this analysis is called "conclusion". Therefore, when the case file was concluded, it meant that the case had gone through all the stages and was ready for the judge to rule, decide or sentence.

There was no deadline for carrying out this entire procedure, meaning that the time taken from registration in the Ledger Book of Records to completion depended on the routine adopted by the Judicial Registry. This routine did not follow any standardization, and each Judicial Unit followed a procedure without any kind of effective oversight of the entire process, which meant that certain cases ended up forgotten in the filing cabinets of the Courts or, in *contrario sensu,* developed their natural path towards the delivery of the judicial service, the sole objective of any process, whether physical or electronic.

With the passage of time and technological development, handwritten documents were replaced by stamps, then by manual typewriters and then electric typewriters, until they were replaced by desktop computers and today by laptops, tablets and even smartphones. The emergence of the computer has brought about significant modernization, since the distribution of files

has become fully automated, and document templates have been stored and standardized, according to need, in folders organized on the computer itself.

Faced with the possibility of transmitting data and information via the World Wide Web through an internet connection, people began to think about the possibility of working and processing legal proceedings no longer on paper, but in digital/electronic form, thus, giving rise to the Electronic Judicial Process.

The new communication technologies have been able to induce a change at a cultural level, with internal and external actors adapting to a new experience, as well as establishing new patterns of behavior and new expectations about the nature and use of information. [2]

A new reality was emerging and, with it, a new way of working. The historical milestone of this moment is as relevant as the one when handwritten notes were replaced by typing or, later, when the computer replaced the typewriter.

The Electronic Judicial Process is a system developed by the National Council of Justice based on forensic practice, experience and with the collaboration of various Brazilian courts, as well as society involved in the day-to-day running of the courts. In 2009, the *PJE* project began with the active participation of the Federal Regional Courts and the Federal Justice Council. However, at that time, for technical reasons, the development was halted by the National Justice Council, but was later taken up by the Federal Regional Court of the 5th Region, which, on its own, began to implement software that, after various improvements, is now installed in almost all the courts. The new technological procedures and their impact on the pace at which cases are processed are evidence for further studies on the subject.

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2 SANTOS, Boaventura de Sousa. A sociologia dos tribunais e a democratização da Justiça. *In:* SANTOS, Boaventura de Sousa. **Pela mão de Alice**: o social e o político na pós-modernidade. 2. ed. São Paulo: Cortez, 1996.

THE SOCIAL AND LEGAL DIMENSIONS OF THE ELECTRONIC JUDICIAL PROCESS

Brazil is a democratic state governed by the rule of law, structured on the independence and harmony of the executive, legislative and judicial branches, as set out in Article 2 of the 1988 Federal Constitution. The Democratic Rule of Law is also known as the Constitutional State, the Post-Modern State or the Post-Social State. The Democratic State takes care to protect and seek the effectiveness of human rights of the first, second and third generations or dimensions.

> [...] the fundamental objectives of the Democratic Rule of Law are the construction of a freer, fairer and more supportive society, the correction of social and regional inequalities, the promotion of well-being and social justice for all people, socio-environmental development, peace and democracy.[3]

It should be added that the 1988 Citizen's Constitution brings numerous fundamental rights and guarantees. Furthermore, the Magna Carta elevates human dignity to the category of a major principle that radiates its force throughout the legal system, as set out in Article 1, item III, of the CF/88.

From then on, the dignity of the individual became the basis for any and all creation, interpretation and application of the rules that make up the legal framework. In this vein, fundamental rights and guarantees gained strength, having the following characteristics: historicity; universality; immutability; competition, irrenounceability, inalienability and imprescriptibility. In addition, rights and guarantees extend to all people who are in the national territory, even if only temporarily, according to the position already expressed by the Federal Supreme Court.

In view of the Citizen Constitution and the values advocated by the Magna Carta, modern doctrine has evolved to merge the dignity of the person with the principle of maximum effectiveness of fundamental rights in order to give

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3 LEITE, Carlos Henrique Bezerra. **Curso de Direito Processual do Trabalho**. 12. ed. São Paulo: LTr, 2014.

them practical cogency, reaching the process and procedure in all spheres of the Judiciary. It must not be forgotten that the process is the means used to realize the material Law in the specific case. Along these lines, the realization of the dictates of justice in practice depends on procedural instruments that are legitimately recognized in the country.

Thus, the main objective of the Democratic Rule of Law is to guarantee the effectiveness of the rights and guarantees listed in the 1988 Federal Constitution and in the international treaties to which Brazil is bound. Therefore, the Post-Social State wants and desires to promote the defense of fundamental rights and, of course, to develop the process of social inclusion on a large scale. At this point, the state plays an essential role through the implementation of public policies, as well as the inclusion of the various social actors in government planning.

It is worth mentioning that Article 8 of the 1948 Universal Declaration of Human Rights states that "everyone has the right to an effective remedy before the competent national courts against acts violating the fundamental rights recognized by the Constitution or by law".

The truth is that procedural celerity was introduced into the Brazilian legal system as a result of the concern of the state and society to annihilate the slowness that plagues justice in all its spheres. This was caused by the need for an urgent solution to the "justice problem" that drives institutions, the Brazilian Bar Association and society, all in search of a quick and economically viable solution. Furthermore, the lack of swift judicial action affects legal certainty and social peace, given the continuing sense of impunity and the high level of discredit in the judiciary. There is no doubt that the expression "celerity" is an indeterminate concept that can only be ascertained in each specific case, given that the process is an instrument for realizing the substantive right claimed. In other words, the process seeks to apply the rules present in the legal system, including the principles, in a way that is coherent with the relationship between the parties. It is necessary to establish an honest bridge between what is laid down in law and real solutions to real people's problems.

The reasonable duration of the process is relevant, especially as it aims to bring the law closer to the real problems of the citizen and seeks to promote

this in a sufficient time to provide the court the effective protection of the good of life claimed in the lawsuit. For example, a lawsuit that has lasted for 20 years and, when it has been finalized, settled and ready to begin enforcement proceedings, the plaintiff has passed away and his successors will continue on, is innocuous and deeply draining.

It is believed that disbelief in the institutions that govern the state is a factor in defragmenting and weakening power, and should be avoided. In fact, a strengthened state provides protection, preservation and practical application of people's rights and, consequently, promotes social peace and harmony. It is noteworthy that, with the advent of the 1988 Federal Constitution, citizens' access to justice has grown, culminating in an increase in demands and also in slowness. It can be seen that the Judiciary was not prepared to receive the number of lawsuits that access to justice led to being filed.

It is within this reality that public judicial management is necessary in order to reverse the current situation in the Judiciary and allow the maximum effectiveness of constitutional precepts, including the reasonable duration of proceedings and procedural speed. It should be noted that, for a long time, the methods, routines, planning and ways of working of the private sector were not applied to public bodies, often justified by the excessive bureaucracy that prevailed within the Public Administration. However, with the advent of Constitutional Amendment 19/1998, the principle of efficiency was expressly included in the list of art. 37, caput, of the aforementioned law, bringing ideas and concepts of managerial administration into the national regulatory framework, imposing on the public sector the duty to produce more with fewer resources. Daniela Mello Coelho's words on the subject are apt:

> It is worth noting, however, that the principle of efficiency does not only apply to public services provided directly to the community. On the contrary, it must also be observed in relation to the internal administrative services of federal entities and those linked to them. This means that the Administration must make use of modern technology and the methods adopted today in order to achieve total quality in the execution of the activities it is responsible for, including creating an organizational chart in which the managerial

> functions and the competence of the agents who must carry them out are highlighted. It is these objectives that have given rise to recent ideas about managerial administration in modern states (public management), according to which it is necessary to identify management that is compatible with the common needs of the Administration, without harming the public interest that drives all administrative activity. [4]

Therefore, in order to achieve the goal of efficiency, it is crucial to merge ideas, means and instruments typical of managerial administration with public administration, such as the use of strategic planning; the setting of deadlines; the creation of targets and criteria for measuring productivity and performance. Considering the number of cases filed every day, the Judiciary needs a plural solution without losing sight of its commitment to the jurisdiction. *Carlos Haddad* and *Luis Pedrosa*, in their book *Administração Judicial Aplicada,* deal with the concept of a management model:

> The Management Model or System is the set of activities and resources coordinated specifically to obtain and sustain previously planned results. Management control determines how work will be carried out in an organization. For this to work successfully, it is necessary, among other things, to set and plan objectives; motivate people and align resources; coordinate and control activities; develop professionals and train specialists; apply knowledge and distribute information; build and cultivate relationships, among others[5]

Thus, the use of information technology tools applied to public judicial management can be effective and achieve speed if combined with other factors, such as hardware and a human workforce qualified to operate the software. It is worth mentioning the main aspects that must be taken into account when creating and implementing a management model: strategy; structure and

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4 COELHO, Daniela Mello. **Administração Pública Gerencial e Direito Administrativo**. ed. Mandamentos, 2014

5 HADDAD, Carlos Henrique Borlido; PEDROSA, Luiz A. Capanema. **Administração Judicial Aplicada**. Porto Alegre: Sérgio Antônio Fabris, 2014.

resources; a schedule for carrying out activities; establishing routines and projects; and indicators and goals.

Based on these considerations, it can be said that the software *Processo Eletrônico Judicial da Justiça do Trabalho — PJE-JT* is the application of the management model with a preponderance of the use of technological tools as a measure to achieve speed. Therefore, the principle of the reasonableness of the length of the process, included in the Magna Carta by Constitutional Amendment 45/2004, attempts to meet society's demands for swift justice, insofar as slowness is a very serious problem in our country's justice system and, so far, has no real solution, given that the number of lawsuits filed grows every year.

THE ELECTRONIC JUDICIAL PROCESS AND ITS CONNECTIONS

Considering the political, social and economic context in which the Brazilian justice system operates, it is pertinent to understand the Electronic Judicial Process and its connections as a management model capable of speeding up procedures and effectively promoting public judicial management. Thus, it is necessary to know and understand the transformations caused by the computerization of the judicial process through a process of investigation based on the perception of the user of the Electronic Judicial Process of the Labor Courts. Therefore, in order to lay the foundations for the thematic investigation into the Electronic Judicial Process and its connections, its foundations are described, grounded on the epistemology of the computerization of the judicial process, Public Management and Procedural Legal Governance.

COMPUTERIZATION OF THE JUDICIAL PROCESS

The Electronic Judicial Process — *PJE* is a recent reality in Brazilian law. The software developed by the National Council of Justice — *CNJ,* together with the Courts and the Brazilian Bar Association, still needs repairs and improvements. In this sense, there are recent studies that accredit the PJE as a technological tool that contributes to procedural speed and the efficiency of

public judicial management. Therefore, it also promotes legal certainty and the effectiveness of justice.

Law No. 11.419/2006 deals with the computerization of judicial proceedings and represented a significant opening up of traditional process to the practice of acts by electronic means. Article 1 of the law in question states that "the use of electronic means in the processing of judicial proceedings, communication of acts and transmission of procedural documents shall be permitted under the terms of this law".[6] Art. 8 of Law No. 11.419/2006 states: "Art. 8 The bodies of the Judiciary may develop electronic systems for processing of legal actions by means of totally or partially digital files, preferably using the World Wide Web and access through internal and external networks".[7] In this vein, the Superior Council of Labor Justice (*CSJT*) issued Resolution 94/2012, which included the *PJE-JT* as a system for performing procedural acts and processing information, establishing the criteria for its implementation and operation.

PUBLIC MANAGEMENT: THE SOCIAL AND LEGAL DIMENSIONS OF THE ELECTRONIC JUDICIAL PROCESS

Procedural celerity was introduced into the Brazilian legal system as a result of the concern of the state and society to eliminate the slowness that plagues justice in all its spheres. This was caused by the need for an urgent solution to the "justice problem" that drives institutions, the Brazilian Bar Association and society, all in search of a quick and economically viable solution. Furthermore,

6 BRASIL. Lei nº 11.419, de 19 de dezembro de 2006. Dispõe sobre a informatização do processo judicial; altera a Lei nº 5.869, de 11 de janeiro de 1973 — Código de Processo Civil; e dá outras providências. Brasília, DF: Presidência da República, [2000?]. Available at: https://www.planalto.gov.br/ccivil_03/_ato2004-2006/2006/lei/l11419.htm. Accessed on: 24 jul. 2023.

7 BRASIL. Lei nº 11.419, de 19 de dezembro de 2006. Dispõe sobre a informatização do processo judicial; altera a Lei nº 5.869, de 11 de janeiro de 1973 — Código de Processo Civil; e dá outras providências. Brasília, DF: Presidência da República, [2000?]. Available at: https://www.planalto.gov.br/ccivil_03/_ato2004-2006/2006/lei/l11419.htm. Accessed on: 24 jul. 2023.

the lack of swift judicial action affects legal certainty and social peace, given the continuing sense of impunity and the high level of discredit in the judiciary.

In this context, the *PJE* is a software that aims to connect legal operators the right of access to labor justice, promoting procedural speed, as well as contributing to the public management of the judiciary. The *PJE* promotes the debureaucratization of administrative and procedural management, namely: dropping cases; joining of petitions; manual counting of deadlines, among other routines. Another noteworthy point is the gradual elimination of manually collected and destined reports for the Internal Affairs Department and the CNJ. All this is possible because the PJE system itself is in charge of tasks that are characterized by mere repetition, following the procedural flow. In this way, civil servants will be redirected to functions that require detailed analysis, as well as to the final areas of the Judiciary.

The National Council of Justice (*CNJ*) has published on its website, on the world wide web, how the *PJE* should be understood:

> Just imagine the judiciary as a vehicle that has to transport a load from one point to another. The cargo would be the court decision; the engine, the magistrates and civil servants; and the time and fuel, the cost of the judicial process. In a traditional process, it uses more fuel and takes longer to reach its destination because its engine has to move, in addition to the "useful" load, the load of the truck itself. In the electronic process, the Judiciary would be a new passenger vehicle, with a lighter engine, which can get the cargo to its destination faster and at a lower cost. [8] (Brazil, *CNJ*, 2018).

The comparison made by the CNJ demonstrates that the synchronization of the process with information technology can use the latter's dynamism and

8 RODRIGUES, Luciléa Lage Dias. O desafio do PJe-JT em busca da eficiência da gestão processual e da celeridade: nova realidade do poder judiciário trabalhista. 2016. 16 f. Monografia (Aperfeiçoamento/Especialização em Gestão Pública Judicial) — Universidade Federal de Ouro Preto. Ouro Preto, 2016. Available at: https://as1.trt3.jus.br/bd-trt3/handle/11103/45428 . Accessed on: 31 ago. 2021.

automaticity to speed up procedural routines and thus, promote the planning of the "traffic" of demands with rapid flows that are independent of direct human action.

PROCEDURAL LEGAL GOVERNANCE

The Democratic Rule of Law is based on guaranteeing the effectiveness of the rights and guarantees listed in the 1988 Federal Constitution and in the international treaties to which Brazil is bound. Therefore, the Post-Social State wants and desires to promote the defense of fundamental rights and, of course, to develop the process of social inclusion on a large scale. At this point, the state plays an essential role by implementing public policies, as well as involving the various social actors in government planning. In this sense, it is necessary to establish coexistence rights as an effective way of optimizing the solution of possible conflicts, and the resolution of disputes must be agile enough to achieve the basic constitutional principles.

It is therefore believed that disbelief in the institutions that govern the state is a factor in defragmenting and weakening power, and should be avoided. In fact, a strengthened state provides protection, preservation and practical application of people's rights and, consequently, promotes social peace and harmony. Therefore, it is essential that Procedural Legal Governance is based on the premises of transparent legal practices, with socio-environmental responsibility and through continuous evaluation of actions to achieve public policies to assist social actors.

In Brazil, the symbol of agility has been given the name *PJE — Processo Judicial Eletrônico* (Electronic Judicial Process), which will have to unite Justice and Technology. This binomial, if applied well, could lead Brazil to a pioneering position in the satisfaction of resolving disputes. On the other hand, failure could lead to a setback with unimaginable consequences.

ANALYSIS OF THE EVIDENCE RELATING TO THE ELECTRONIC JUDICIAL PROCESS AND ITS CONNECTIONS

Studying legal phenomena and their relationship with everyday research practices opens up a space for understanding their meaning and sense in the field of scientific research. In this context, it is essential to study the repercussions of the implementation of the electronic judicial process in the Labor Courts in Brazil, with regard to practices related to the processing of judicial proceedings with a view to effective judicial provision. Thus, in order to analyze the social and legal framework of the implementation of the Electronic Judicial Process as a governmental public policy action, data was collected from legal operators who work in the Labor Courts, using an electronic Google Forms form, sent by e-mail.

The research tool was modeled on the structuring elements of the Electronic Judicial Process system and its connections, with the following objectives:

- Identify whether there is evidence that the implementation of the *PJE* has reduced the average duration of cases from the time they are filed to the time they become final, with effective judicial provision.
- Identify the user's perception of the social and legal dimension of the implementation of the *PJE* as a governmental public policy action.
- Identify whether there is evidence of Procedural Legal Governance with the organizational and technological innovations arising from the implementation of the Judicial Electronic Process — *PJE*.

The data obtained in the field research, relating to the implementation of the *PJE — Processo Judicial Eletrônico* (Electronic Judicial Process) in the Brazilian Labor Courts, has a degree of reliability and internal consistency measured by Cronbach's Alpha between good and reasonable for the analysis variables: computerization of the judicial process (0.81); public management (0.79) and procedural legal governance (0.80). On the other hand, the degree of association between the variables, measured by Pearson's Correlation Coefficient, has a strong and moderate positive correlation: computerization of the judicial

process (0.85); public management(0.97) and procedural legal governance (0.50). Therefore, the reliability and internal consistency of the data is inferred in order to assess the results obtained in the research.

In this context, through a descriptive analysis of the research data, in the perception of the legal operator in the Labor Courts, it is possible to evaluate a set of positive evidences in relation to the electronic judicial process system implemented by the Brazilian Labor Courts, with regard to the variables analyzed and their respective indicators, namely:

- The computerization of the judicial process, in reference to the judicial service indicator, there is a perception that the *PJE* has improved judicial delivery (78.8%) and that there has been a reduction in the time between the final judgment and the effective achievement of the right (60.6%). The procedural economy indicator shows that there is a better use of legal practices in relation to jurisdictional acts (79.7%) and a reduction in time between the filing of the lawsuit and the effective delivery of justice (72.7%). Finally, in the perception of the legal operator, the procedural efficiency indicator provides evidence of an increase in productivity through the standardization of procedural acts (66.7%)
- The public management variable, with regard to the legal process innovation indicator, shows that the time between filing a lawsuit and obtaining a sentence has been reduced after the implementation of the *PJE* (66.5%), as well as the analysis of appeals by the 2nd Instance of the Labor Court being more agile (54.60%). The debureaucratization indicator, rationalization of administrative procedures, shows positive evidence in relation to the transition from physical to digital proceedings, considering that it has facilitated the work of the legal operator (90.9%). However, it is worth noting that a portion of those interviewed pointed out that the electronic judicial process has hindered their work as a legal professional (18.2%), as well as pointing out that

the judiciary has not been concerned with training legal professionals to use the *PJE* system (36.4%).

- The procedural legal governance indicator for transparent legal practices shows that the implementation of the *PJE* has brought greater transparency to the judicial process in the Labor Courts (72.8%). With reference to the Corporate Social Responsibility indicator, it can be seen that the implementation of the *PJE* has improved working conditions for lawyers practicing in the Labor Courts (84.8%). It is also worth highlighting the compliance and risk management indicator, which provides evidence of the reliability of the *PJE* system (84.8%).

Finally, we conclude that, based on the evidence presented by the results of the empirical data set analyzed, in the perception of the legal operator, the Electronic Judicial Process of the Labor Courts has brought about a series of innovative transformations in the provision of judicial services, with an emphasis on economy and efficiency in public management. What is also noteworthy is the agility of decisions related to administrative and procedural management. In addition to reducing the time taken between the filing of the lawsuit and the outcome of the sentence.

CONCLUDING REMARKS

The progress and use of new technologies and the expected demands of modern society pose new challenges for public organizations. As such, this study had as its guiding object the definition of the following research question: what is the social and legal dimension of the implementation of the Electronic Judicial Process as a governmental public policy action? Thus, grounded on the epistemology of the computerization of the judicial process, Public Management and Procedural Legal Governance, the Electronic Judicial Process and its connections research tool was developed in order to understand the role of the internal and external actors involved in the Electronic Judicial Process, as well as to evaluate the perception of the legal operator in relation to the implementation of the Electronic Judicial Process in the Labor Courts in Brazil.

The results obtained in this scientific investigation show that the *Pje* is a technological tool capable of speeding up procedures and making public judicial management more efficient. In addition to promoting legal certainty and the effectiveness of justice. This inference is based on the results obtained in relation to the data sets of the variables analyzed. In this way, the following inferences can be drawn for the data set of variables analyzed:

1) The *Pje* system has promoted a reduction of time between transit and the result of the achievement of the right
2) The technological innovation resulting from the *Pje* system has promoted an effective reduction in time between the filing of the lawsuit and the outcome of the sentence
3) The legal governance resulting from the Electronic Judicial Process has brought greater transparency to the judicial process in the Labor Courts
4) Increased efficiency of the Electronic Judicial Process-*PJE*, by reducing bureaucracy and rationalizing administrative resources
5) Innovation in the legal process is a strong indicator of the agility of decisions in administrative and procedural management.

Finally, it is worth highlighting the relevance of this research to understanding the dynamics of the Electronic Judicial Process and its social and legal dimensions from the perspective of society and public policies inserted into public management projects. In today's times, when the speed and dynamism of information and conflicts are multifaceted, it is essential that law enforcers are attentive and sensitive to understanding and evaluating the social and legal dimension and its connections with the judicial public management system.

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CAPÍTULO 12

Information Management of SMEs in Portugal (North and Center)

Technology data extracted from the GIPMEI project

Armando Malheiro da Silva
Sónia Catarina Lopes Estrela
Eliane Pawlowski de Oliveira Araújo
George Leal Jamil
Claudio Roberto Magalhães Pessoa

Companies face many challenges. Especially in the last two decades, the business world has been marked by globalization, continuous technological development and fierce competitiveness, a context which emphasizes the role of information as a strategic asset and resource in organizations. The phenomenon of information, inexorably linked to information and communication technologies (ICT), has profoundly characterized this scenario because, as Ribeiro (2005) states, technology is no longer a mere resource or a tool that aids in processing and retrieving information, but has become inseparable from it throughout its whole life cycle: production, processing, use and storage.

The impact of digital technologies is visible and transversal to all aspects of individuals' existence, companies and organizational processes themselves, with profound changes in the way people and companies relate and interact. The ongoing digital transformation breaks down barriers and technology is able to help creating innovative products and services and more effective and

efficient ways of working, therefore contributing to greater effectiveness and efficiency for both workers and organizations (Rogers, 2017). However, despite this transformation, carries a multitude of possibilities, it also poses challenges that should be analyzed and reflected upon in order to identify ways of assisting organizations to face and respond competently to these new scenarios.

Considering this reality and the widely recognized importance of information and digital technologies, this chapter is part of a broader study of small and medium-sized enterprises (SMEs)[1] in the North and Centre of Portugal as part of the project Information Management and Digital Culture in Industrial SMEs in Portugal: Behavior, Memory and Innovation (GIPMEI). The data presented was collected through a survey and aims to analyze the use of digital by these companies, namely the areas whose business processes are carried out with the support of information systems or digital platforms, the types of systems used, the use of social media and to assess whether these companies have already recorded incidents related to information protection and security, as well as to identify implemented measures.

The importance of this research may be observed, as highlighted in the Davos Report (WEF, 2023), in the fact that the true value of information lies in the knowledge that might be obtained and in the strategies that may be fostered through it. In this sense, the use of information systems is fundamental for SMEs to use information strategically for the business, a condition that must be combined with two other factors: the existence of staff designated to supervise operations related to Information Technology (IT) and information security, as well as a team of employees qualified for its critical use.

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1 Within the category of Small and Medium-sized Enterprises (SME) there are the medium-size enterprises, which employ fewer than 250 persons and whose annual turnover does not exceed EUR 50 million, and/or an annual total balance sheet not exceeding EUR 43 million. A small enterprise employs fewer than 50 persons and has an annual turnover and/or annual total balance sheet not exceeding EUR 10 million. A microenterprise employs fewer than 10 persons and has an annual turnover and/or annual total balance sheet not exceeding EUR 2 million.

The study developed also aligns with the purposes of the European Commission, who defined the Digital Decade Policy Programme[2] aiming to build Europe's digital future and established, as one of its pillars, the need for the digital transformation of companies. In this aspect, we highlight that this programme established as a target for 2030, that over 90% of the SMEs reach at least a basic level of digital intensity. It is also important to emphasize that achieving this objective is inseparable from developing basic digital skills, as well as from the existence of safe and sustainable digital infrastructures.

We must consider these highlights because despite being a movement that has been structured since 2014 (with the establishment of regulations on Cybersecurity, Data Protection, among others) (European Commission, 2020), some goals are below expectations, regarding both the European Union and the Portuguese reality. In 2022, for example, 69% of small and medium-sized companies in the European Union (EU) achieved basic digital intensity, an index that is approximately 20% below the ambition defined for 2030. This diagnosis is compounded by the fact that "the majority of SMEs had a low level of digitalization, with 31% recording a very low level, and 38% a low level of Digital Intensity Index[3]".

Portugal, which is placed on the tenth position in this statistic, has, however, mobilized to change this scenario, by establishing digitalization as a strategic priority, since the country considers this is essential for the its economic growth. Through initiatives such as the Digital Transition Action Plan, a document prepared by the Portuguese state aligned with the purposes of the European Commission, digitalization has been regarded as the engine capable of promoting the country's transformation.

The commitment to this pillar of digital transformation of the business sector is essentially based on measures and actions which provide support for

2 More information can be found at https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_pt

3 For more information about the Digital Decade goals for Europe, see https://ec.europa.eu/eurostat/statistics-explained/SEPDF/cache/108644.pdf

investment, encouragement of the digitalization of companies, and awareness and training particularly to SMEs, which represent the core of business sector and employment in Portugal, and the development of initiatives that contribute to the consolidation of scientific and technological business knowledge (Plano de Ação para a Transição Digital de Portugal, 2020).

GIPMEI is therefore based on the perspective of consolidating scientific knowledge with the aim, based on the studies by Estrela (2016) and Pessoa (2016), of supporting and enabling SMEs to adopt good information management (IM) practices aligned with the implementation of information and communication technology strategies that adequately support them to improve their performance. As a consequence of this initial step, the studies carried out at GIPMEI have sought to diagnose the problems and to identify and propose technical and technological solutions that are more suited to the characteristics and needs of Portuguese industrial SMEs. However, these actions involve not only implementing strategies, but above all understanding the added value of information as an organizational resource that needs to be managed to create value.

INFORMATION MANAGEMENT: THE INVISIBLE ASSET

Despite the widespread turmoil between information and information technology which leads to the hasty association between the use of computers or digital devices and information, a misconception that is added to an older one, which is that of confusing information with news[4], creating, organizing, storing and using documents, containers, and contents (or verbal, written, numerical or audiovisual information, etc.) — it is something that any entrepreneur, no

4 There are many examples of this misconception, such as the disclosure short book by Fernandes (2011). In the chapter "O papel da informação numa democracia liberal" (The role of information on a liberal democracy"), the heading is a sentence by Thomas Jefferson: "If I had to decide whether we should have a government without newspapers or newspapers without a government, I would not hesitate for an instant to prefer the latter" (Fernandes, 2011, p. 40). Information is used strictly as a synonym for the press, newspapers, and media in general.

matter how small (due to the size of their company), tends to neglect, to let flow, investing little or poorly in valuing it. This behavior, which the GIPMEI research project aims to investigate in depth, is the opposite of the requirements of the cyclical process of information management, a process which, in the field of Economics and Management and (Technological) Information Systems, is being replaced by knowledge management. Drucker defined it as the ability to manage, discover, map, classify, capture, distribute, create and retain knowledge efficiently, effectively and competently so that an organization might gain a competitive advantage over others in order to generate profit and ensure its survival and expansion in the market (*apud* Carvalho; Gouveia, 2023, p. 46)[5].

However, this definition is tarnished with a from a misconception that should be clarified from the start: this knowledge is cerebrally produced and externalized. In other words, it is explicit and not tacit or implicit and, in this sense, there is no way to separate it from information, understood as a structured set of codified rational or emotional representations (sign and symbol) shaped by social interaction, capable of being recorded on any material support and capable of being communicated synchronously or asynchronously and uni or multi-directionally (Silva; Paletta, 2022, p. 12). They are mental and emotional representations of any kind materialized in any support (paper or digital) and human activity, no matter what the situation, context, and socio-political environment, generates an infocommunicational flow that is the object of Information Science, understood as a "social science that investigates the problems, issues and cases related to the perceptible and cognizable infocommunicational phenomenon through the confirmation of the properties inherent in the genesis of the flow, organization and informational behavior. A science that studies an

5 In the same work, the concept of Ba is explained: "creation of a Knowledge Sharing Space" conducive, consequently, to knowledge management, but which necessarily includes information management: "Information Management is (must be) one of the concerns of the most informed and active organizations from an economic point of view", according to Gouveia (2012, p. 63). For the author, in this sense, considering the economic value for organizations, "it is necessary to ensure the processing, organization, and preservation of information, both at the individual level and, more challenging and crucial, at the level of the organizations themselves" (Gouveia, 2012, p. 62).

entire process from the origin, through to the collection, organization, storage, retrieval, interpretation, transmission, transformation and use of information" (Silva; Paletta, 2022, p.12). It is an applied social science that, inherited from technical-professional disciplines (Archival Science, Librarianship, Documentation and Museology), now integrates them into its unified field, as well as a substantial part of the Information Systems area, because the genesis, organization, retrieval, and use of information is increasingly done and will tend to be hegemonic using digital technology. This fact means that the scientific dimension is at the basis or root of the practical performance embodied in the profile of the information manager, the professional of the present and the future, a professional who absorbs various functional designations such as content manager and data manager into their skills.

Information and knowledge management, the practical and professional role of the Information Science graduate or master, has become key to the daily functioning and competitive performance of organizations or companies and this is not something recent, if we go back at least as far as the 19th century and witness the emergence of professionals called "bookkeepers" in charge of writing or commercial bookkeeping, i.e. accounting records that will evolve but whose foundations date back to that time and have earlier roots. Bookkeeping was done on paper books and today all the information and communication activity of micro, small, or medium-sized companies is generated on a technological medium that shapes and conditions the contents but does not alter their nature. The digital platforms created to produce, process, classify, store, and retrieve information are only useful and have an impact on the success and competitive performance of companies if there is an effective match between technology and information.

This is not the only aspect, nor does it exhaust the complex problem of information management in SMEs, but it is undoubtedly an urgent issue that causes a lot of entropy and serious expense, which micro and small companies in particular must avoid at all costs. A key example of this is the acquisition of software that is compatible with other complementary IT solutions, to achieve interoperability between systems and not to block them or incur unnecessary equipment costs. As an alternative to proprietary digital document

management platforms, there is the so called free or open-source software, which also requires dedicated and specialized staff, which always implies an expense under the human resources heading. To avoid this expenditure, it is common practice for small business owners to assign their accounting activities to external accounting offices – they outsource this function, but in doing so assign document possession to third parties and once the mandatory retention periods for tax and economic control purposes have expired, the way is quickly paved for their disposal and with it the absence of memory in the company – a not insignificant factor for competitive performance in the market.

Adapting technology to information management therefore implies a detailed diagnosis of the reality and, as a result, a flexible plan of varied solutions, all of which converge towards a single goal: to place the company on the road to sustainability and legal, healthy success in the market in which it operates. GIPMEI focused on a segment of small and medium-sized companies, the industrial sector, limited to two regions of Portugal, which we present in brief in the following section.

INDUSTRIAL SMES IN THE NORTH AND CENTER OF PORTUGAL

SMEs play an essential role in national economies and, in the case of Portugal, according to data from the National Statistics Institute (INE), in 2021, they represent 99.9% of the companies, they were responsible for 60.1% of the country's turnover and employed 78.5% of the Portuguese workers. As the focus of the research is on SMEs in Section C of the Classification of Economic Activities (CAE) (Rev. 3) in the North and Central regions of Portugal (N&CR)[6], it should be noted that of the 67 317 national companies active in

6 We follow the Nomenclature of territorial units for statistics (NUTS), which is a geographical nomenclature subdividing the economic territory of the European Union into regions at three different levels (NUTS 1, 2, and 3 respectively). The North and Center regions are two of the 7 Portuguese level 2 units, corresponding to around 54% of the Portuguese territory, with 56.2% of the population residing in Portugal concentrated within their borders, with an average of 124.6 inhabitants per km2 (11 .7 higher than the

the manufacturing industry (Table 1), 73.1% (49 233) are located in the N&CR, employ almost 79% of workers and are responsible for 63.2% of the turnover of national companies in this section. Companies in section C of the CAE account for 7.2% and 6% of the business in NR and CR respectively. In terms of the size of these companies, 99.4% are SMEs, of which 96.4% are micro and small companies and 3.6% are medium-sized. Only 0.6% of the companies in section C in 2021 were of large dimension.

These figures highlight the importance of these companies and their predominance in the N&CR. The choice of these companies is mainly due to these figures and the strategic importance that the industry has in the national economy, with a strong impact on Portuguese exports since section C was responsible, in 2022, for 93.3% of national exports (Ministério da Economia e Mar: Gabinete de Estratégia e Estudos, 2023, p. 32). They also stand out for their survival rate, which is higher than that of the other companies, making them important cases for study.

However, despite the important role of SMEs in the Portuguese economy, these companies have limitations, such as a shortage of qualified financial, material, and human resources, and low intensity in technology and innovation, among others, which is a constraint on their economic growth and is reflected in the indicators of the country's improved competitiveness. These limitations, according to the exploratory study conducted by Estrela (2016), condition the ability to act and compete in the markets and require SMEs to be creative and responsive both to constant transformations and to the difficulties arising from the volatility and competitiveness of the markets.

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national average). They are the second (Center) and third (North) most extensive and the first (North) and third (Center) most populous regions in Portugal. All together they totalize 186 (60.4%) of Portuguese municipalities (Total: 308).
In economic terms, according to National Statistical Office (INE) data for 2021, those two regions were accountable for 49.3% of the Portuguese Gross Domestic Product (GDP), being respectively the second (North) and third (Center) largest contributors to the national economy after Lisbon metropolitan area (35.6%). Despite this situation, the North region has the lowest gross domestic product *per capita* (€2 681 less than the national average) of the seven NUTS II and the Center region is the fifth (€2 475 less than the national average).

Table 1 — Number, employees and turnover of C-sector companies in Portugal (2021)

	Companies		Employees		VVN (million s €)		VABpm (million €)		Companies by NUTS II
	Nº	Regional Structure	Nº	Regional Structure	Nº	Regional Structure	Nº	Regional Structure	Weight of Section C in the Total
Portugal	67 317	100%	727 114	100%	102 856	100%	24 857	100%	5,0%
Continent	65 529	97,3%	715 278	98,4%	101 548	98,7%	24 580	98,9%	5,1%
North	32 844	48,8%	384 187	52,8%	38 879	37,8%	10 978	44,2%	7,2%
Center	16 389	24,3%	190 084	26,1%	26 100	25,4%	6 817	27,4%	6,0%
Lisbon	10 241	15,2%	100 795	13,9%	29 938	29,1%	5 388	21,7%	2,6%
Alentejo	4 098	6,1%	34 076	4,7%	6 273	6,1%	1 280	5,1%	4,7%
Algarve	1 957	2,9%	6 136	0,8%	359	0,3%	118	0,5%	2,6%
A.R. Açores	1 062	1,6%	7 579	1,0%	965	0,9%	182	0,7%	3,7%
A.R. Madeira	726	1,1%	4 257	0,6%	343	0,3%	95	0,4%	2,4%

Source: Comissão de Coordenação e Desenvolvimento Regional do Norte (s.d., p. 5).

METHODOLOGY

The presented data was taken from an ongoing study on Information Management and digital use in industrial SMEs in the North and Center regions of Portugal. Based on the studies by Estrela (2016) and Pessoa (2016), the themes on which the survey should be created were identified, and sections of questions relating to Information Management, Information Behavior and Literacy, Security and Technology, Memory and Archives and Digital Culture were defined. This paper will present and discuss the data obtained on Technology and Security.

The survey was initially administered online, through the limesurvey platform, and this approach was complemented by distribution and face-to-face collection. The online and face-to-face distribution, which began in the last months of 2022, was complemented, from January 2023, with individualized approaches to companies, by phone contacts and face-to-face visits and subsequent emailing, which took place until September 2023. This alternative is in line with what Ghiglione and Matalon (2002) advocate regarding the possibility of complementing data collection with indirect face-to-face surveys, depending on the success achieved with this instrument (response rate and observational strength of the sample). Thus, by combining these strategies, 136 responses were obtained. The data was processed using the Statistical Package for the Social Sciences (SPSS) software, version 29.0, and is presented using graphs. Whenever there are multiple alternatives to choose from, the percentage is calculated by dividing the number of "Yes" answers by the number of companies which answered.

CHARACTERIZATION OF THE RESPONDENTS

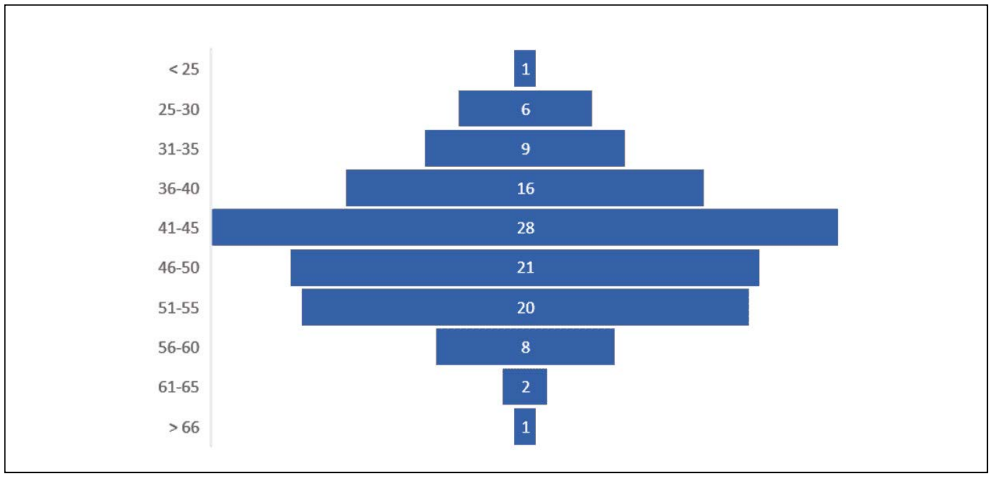
As far as the respondents on behalf of the company are concerned, there is a certain degree of gender balance, with 55.7% male and 44.3% female. Their ages vary between 23 and 67, with 85 (75.9%) of the respondents aged between 36 and 55 (Figure 1). Regarding the position held in the company, the majority of respondents (67.5%) hold management positions (Directors, CEO, Managers, Managing Partners, or responsible for specific areas), around 30%

top management, and 37.7% are directors of specific areas (especially financial directors – 18.4% of total respondents). In 16.7% of cases, they hold positions in the administrative area, 5.3% are accountants and the remaining 10.5% are technicians (namely salespeople, and textile designers, among others) or only mention the departments in which they work.

Concerning the number of years that they have worked in the company this number varies between less than 1 and 42 years. Of particular note are the 32 (28.8%) who have worked for the company for more than 1 year and less than 5 and the 26 (23.4%) who have been at the company for between 6 and 10 years (Figure 2). About the highest level of education they had attended, higher education courses stood out (81.5%). 2.5% of respondents were enrolled in a Ph.D., 49.6% in undergraduate courses, 23.5% in Master's, bachelor's (1.7%), (0.8%) MBA, postgraduate (0.8%), and Higher Professional Technical Courses (2.5%). The remainder were in the 9th Grade (5.9%) and 12nd Grade (12.6%) of Secondary Education.

In terms of geographical distribution, 38.2% of responses were obtained in the North and 61.8% in the Center (Figure 3). The highest number of respondents was obtained in the municipality of Águeda (22.8%) in the Center Region, followed by companies located in Santa Maria da Feira (9.6%) and Vila Nova de Famalicão (8.1%) in the North Region. Among the respondent companies, 12.5% are micro-enterprises, 60.3% are small companies and 27.2% are medium-sized companies. As for the year in which they were founded, 45.4% were founded between 1981 and 2000 (especially the decades 1981-1990, with 22.8% and 1991-2000, with 21.3%).

Figure 1 — Age group (N=112)



Source: authored by.

Figure 2 — Seniority in the company (N=111)

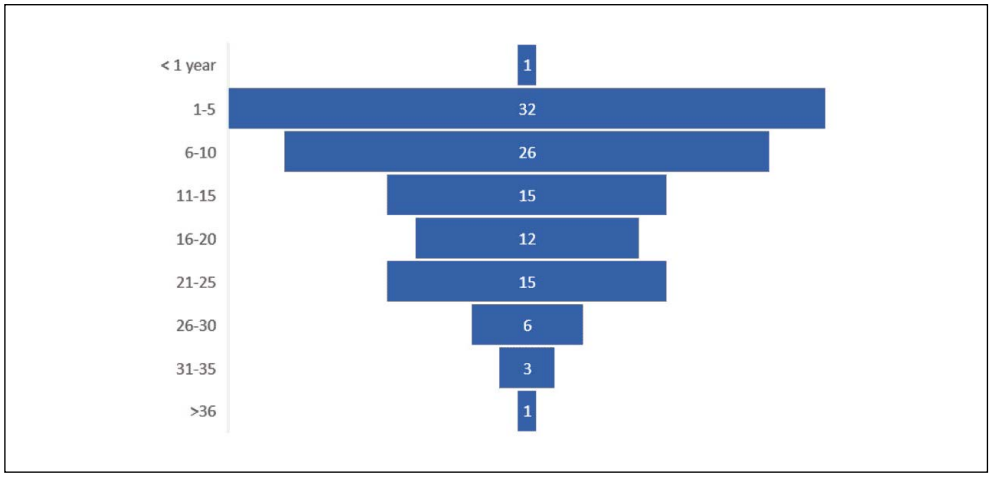


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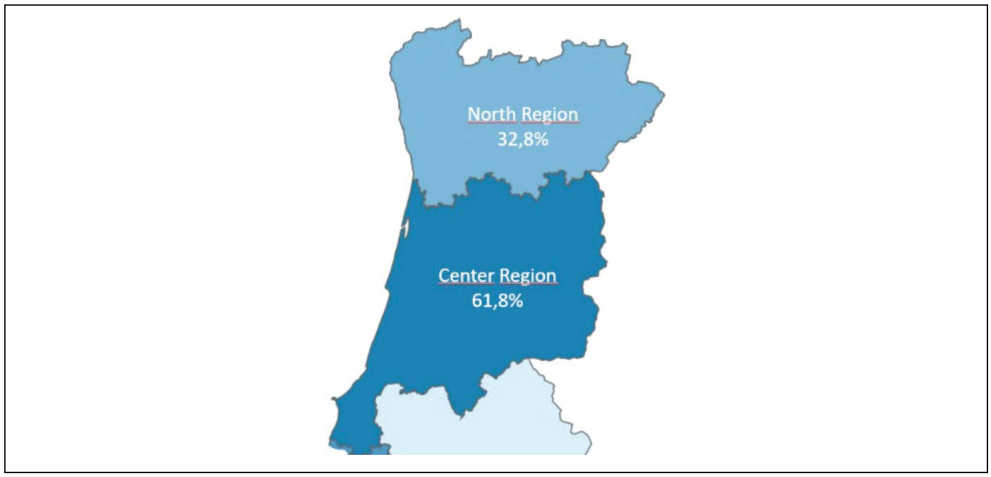
Figure 3 — North and Center Regions



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PRESENTATION OF RESULTS

It's consensual that changes in technology and new innovative business models have transformed social life and business practices. As Laudon and Laudon (2020, p. 43) highlight

> In order to operate, businesses must deal with many different pieces of information about suppliers, customers, employees, invoices, and payments, and of course their products and services. They must organize work activities that use this information to operate efficiently and enhance the overall performance of the firm. Information systems make it possible for firms to manage all their information, make better decisions, and improve the execution of their business processes.

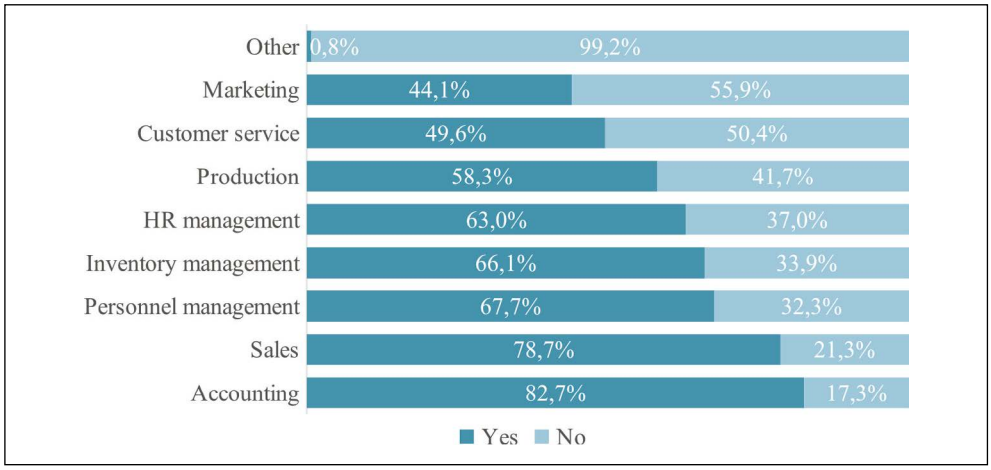
In today's business landscape scenery, IT capabilities, including information management and analysis, have become indispensable for supporting operations and achieving business objectives in all companies. To this end, data on the use of IT systems and information security in Portuguese industrial SMEs is presented and analyzed (WEF, 2023).

Information systems used in SMEs

The vast majority of companies surveyed (96.9%) state that they use information systems (IS). The remaining 3.1% (4) justify that they don't use them because a) the company functions appropriately and does not need to implement these systems); b) employees do not have the required knowledge to work with certain systems; and c) implementing IS is complex and involves risks.

Overall, as Figure 4 shows, the SMEs surveyed carry out organizational processes in various areas using IS. The areas that stand out are Accounting (82.7%), Commercial (78.7%), Personnel Management (67.7%), Inventory (66.1%%), Human Resources Management (63%) and Production (58.3%). Of the listed areas, the ones that make the least use of IS are Customer Service (49.6%) and Marketing (44.1%).

Figure 4 — Use of information systems (areas) (N=127)



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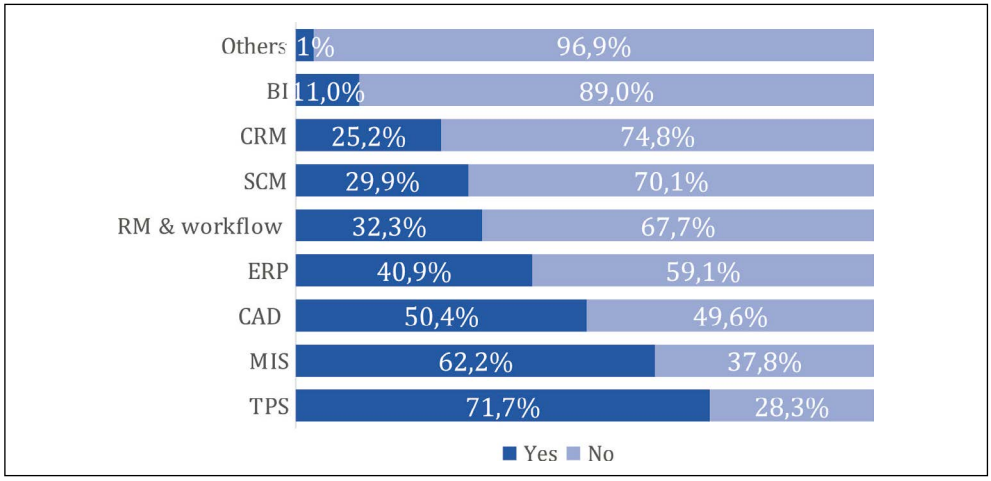
In a multiple choice closed question, it is possible to assess the existence of different levels of digitalization of companies, with 30% of companies stating that processes in the main areas are executed using digital technologies but, on the opposite side, 4.8% stating that they only use it in an area, with emphasis on

the Accounting area; 6.3% have two computerized areas or the 19% that have only 3 computerized areas, highlighting, in addition to accounting, production and inventory or sales and customer support. These figures seem to demonstrate the difficulties that are frequently underlined, especially for smaller companies in their digital transition process. This idea seems to be corroborated when analyzing the data relating to the information systems used by the Industrial SMEs of N&CR in Portugal.

Figure 5 — Types of information systems used by the companies (N=127)



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The main information systems used by the companies surveyed, as can be seen from Figure 5, are:

1) transaction processing systems (TPS) (71,7%) – typically, an organization can use several of these systems to perform specific and routine tasks, namely, to process sales order entry, payroll, or employee record keeping.

2) management information systems (MIS) (62,2%) – this system summarizes and reports on the company's basic operations using data supplied by TPS. They allow to obtain regular and summarized reports on the

company's current performance, based on information gathered on stocks, production, and accounting, and to compare it with forecast performance.

3) computer-aided design systems (CAD) (50,4%) – these systems allow engineers and other professionals to digitally create 2D drawings and 3D models of real-world products before they're ever manufactured. They make it possible to share, review, simulate, and modify designs easily. In this way, they enhance innovation and the creation of differentiated products that get to market fast.

4) enterprise resource planning (ERP) (40,9%) – this type of system integrates the main areas of the companies, namely "business processes in manufacturing and production, finance and accounting, sales and marketing, and human resources into a single software system" (Laudon & Laudon, 2020, p.53).

5) records management (RM) systems and workflow (32,3%), which make it possible to archive and classify documents in digital format.

6) supply chain management (SCM) (29,9%) – those systems help the firms to manage their relationships with their suppliers. It helps suppliers, purchasing firms, distributors, and logistics companies share information about orders, production, inventory levels, and delivery of products and services so they can source, produce, and deliver goods and services efficiently. According to Laudon and Laudon (2020, p. 54)

> The ultimate objective is to get the right amount of their products from their source to their point of consumption in the least amount of time and at the lowest cost. These systems increase firm profitability by lowering the costs of moving and making products and by enabling managers to make better decisions about how to organize and schedule sourcing, production, and distribution.

7) customer relationship management Systems (CRM (25,2%) – this type of system helps manage the relationship between the companies and their customers. They

> provide information to coordinate all of the business processes that deal with customers in sales, marketing, and service to optimize revenue, customer satisfaction, and customer retention. This information helps firms identify, attract, and retain the most profitable customers; provide better service to existing customers; and increase sales (Laudon & Laudon, 2020, p. 54).

8) Business Intelligence (BI) (11%) – this type of system refers to data and a set of tools that allow to organize, analyze, and provide access to data that will support the managers and other enterprise users in the process of decision-making.

Four respondents (3.1%) gave other answers, and in two cases they mentioned two Portuguese suppliers of business management solutions, which encompass several IS.

These results show that a company uses different and various systems simultaneously but with a particular focus on the most basic systems such as TPS, a system that performs and records the daily routine transactions necessary to conduct business and that are critical for the business. On the other hand, we can see that several companies mentioned enterprise systems integrate, such as ERP, SCM, and CRM, which are the key internal business processes of a firm into a single software system to improve coordination and the process of decision-making.

Based on these results, several questions emerge, namely, with all the different types of systems used by the companies how those companies manage all the information in these different systems, how to minimize costs and ensure that all these different systems can share information and help the managers and the employees to be able to coordinate their work. As a result, there is a need to deepen these initial findings in order to obtain answers and a greater understanding of these issues.

In a more specific analysis to assess the number of systems used in each of the companies participating in the study, we observe that, in 18.9% of cases, participants state that they use only one of the systems listed, highlighting TPS

(7.4%), CAD (2.5%), and MIS (2.5%). There are, however, cases of companies that only use CRM (0.8%), ERP (1.6%) or SCM (2.5%) systems.

This data, once again, seem to demonstrate, on the one hand, the need and effort that has been made in the digital transition process but, on the other, the long road to be taken by SMEs in Portugal. The 20-percentage point difference between data on the digital intensity level of 2022 (69%) in SMEs and the European target for 2030 (89%) (Eurostat, 2023) is clear evidence of this gap, that should be recalled.

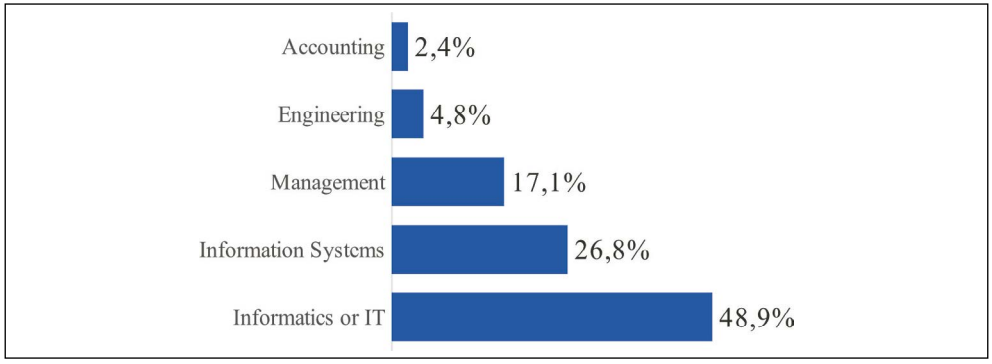
Information System management (responsible) and respective training

Keeping in mind that there are many ways in which the IT function is organized within the firm, namely that a very small company will not have a formal information systems group, we asked whether industrial SMEs in N&CR have an IS manager and, if they do, which areas of training or whether it is an internal employee or whether they outsource this service.

In 71.1% of companies there is someone responsible for IS management, while in the remaining 28.9% there is no person assigned to this role. In the case of the former, in 60.4% of cases they are external workers and in the remaining companies (39.6%) they are internal employees who carry out the task and are responsible for managing the IS.

Internal employees responsible for IS management have training in Informatics or Information Technologies (48.9%), Information Systems (26.8%), Management (17.1%), Engineering (4.8%) or Accounting (2.4%) (Figure 6).

Figure 6 — Training area of the computer systems manager: internal worker (N=36)



Source: authored by.

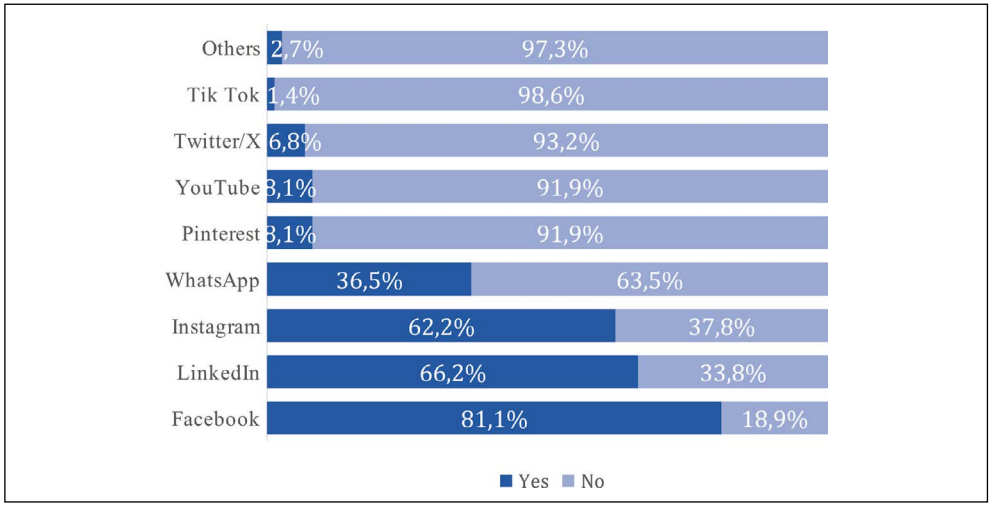
WEB environment

Regarding the presence in the digital world, the majority of companies have a website (83.1%) and 12.5% say they have an online store. It is also noted that 54.4% regularly use social media, globally they use several (between 1 and 8 different social media). 14.9% of firms use only one social media, in 31.1% of cases they use 2; 37.8% use 3 social media; 5.4% use four and the remaining 10.8% use between 5 and 8 social media. The most used, as can be seen in Figure 7, are Facebook (81.1%), LinkedIn (66.2%), Instagram (62.2), and WhatsApp (36.5%).

When asked about the objectives that lead them to use social media, we observe that SMEs do so for different and multiple reasons, with the main motivations being "To promote their products" (87.8%); "To make the company known" (74.3%); "To promote proximity to customers" (63.5%); "To attract new customers" (54.1%); "To recruit new workers" (40.5%) and "To research information about customers, suppliers, competitors" (25.7%)[7].

7 According to Eurostat's data (2023), in 2021, 59% of businesses in the EU used social media. However, differences emerge depending on the size of the business, with large businesses (83%) making more use of social media compared with SMEs (58%). In Portugal, the average use of social media, in the SMEs is 57,5%, very similar to UE's average (in the case of large businesses Portugal presents an average of 84,2%). The most popular types of

Figure 7 — Social media used by SMEs (N=74)



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STORAGE AND ACCESS

Most of the companies (92.9%) that responded to the question state that they have information on paper and digitally. Of the remaining companies, 4.8% declare that they only have information on paper and 2.4% only in digital format (Figure 8).

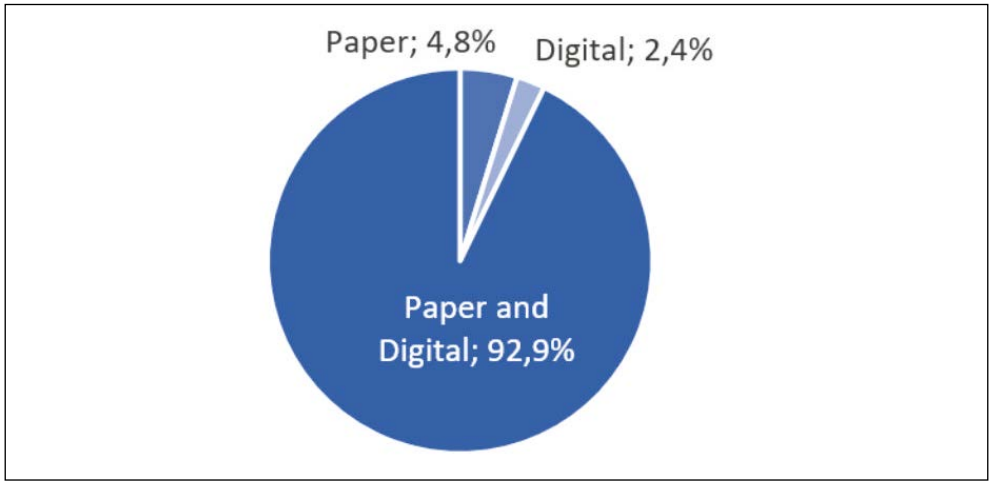
When asked in a multiple-choice question about how the company stores its information in digital format, the 120 respondents to this question showed that it is stored on:

- local servers with "cloud" backups (in 50.8% of companies that responded);
- workers' computers (44.2%);

social media among businesses are social networks such as Facebook and LinkedIn (56% of businesses) or multimedia content-sharing websites such as YouTube and Instagram (28%) (Eurostat, 2023).

- local servers, located on the company's premises, without backup copies (42.5%);
- virtual servers, which are stored in the cloud (24.2%);
- external disks or other similar devices, such as pen drives (22.5%);
- local servers, located on company premises with backup (0.8%).

Figure 8 — Information formats (N=126)



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Regarding the access to digital information by workers, we observe that to access:

- to computers, workers have to enter the user's name and password (in 82.5% of the companies);
- to local and/or virtual servers ("in the cloud") it is necessary to enter the username and password (51.7%)
- computers do not need a username and password (5%);
- other ("the information in question is accessed directly or the person responsible for that type of information is subcontracted) (0.8%).

Despite the ubiquity of digital and the use of digital technologies, information on paper continues to coexist with digital. Thus, 97.7% (123) of companies have information on paper or on paper and digitally, with:

- 59.3% of respondents to this question state that the company stores paper information in cabinets and/or shelves near employees' workplaces;
- 59.3% in room(s) or space(s) dedicated to archiving information;
- 13.8% stated that this information is stored in facilities outside the company.

Regarding the access to this information, opinions are divided, less than half of the responding companies (39.8% of the 123 respondents) do not have standards or procedures and 32.5% have standards or procedures. 38.1% say they have specific rules and procedures that determine what information can be accessed and by whom (for example, the need to record on a form the consulted information, the date and who consulted it). Only in 11.4% of the cases there is limited access per employee or area.

INFORMATION SECURITY

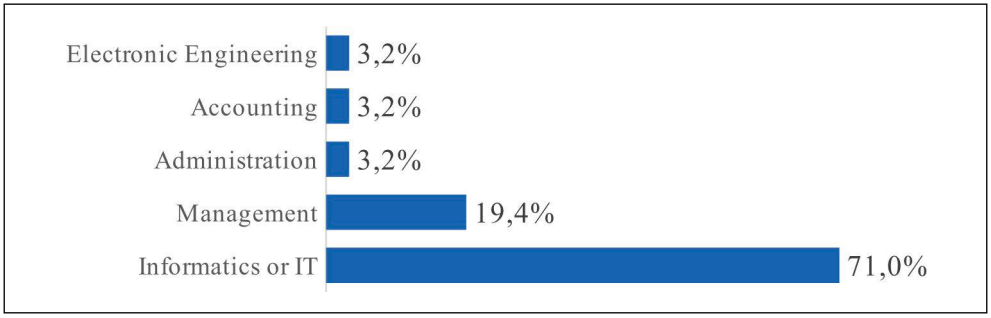
When asked if they already had information security incidents, 80.3% affirm they haven't suffered any problems. The remaining companies 19.7% (25) identified one or more types of occurrences:

- Unavailability, non-operation and failures of computer systems (44%);
- Loss of data in digital format (40%);
- Virus and/or ransomware (condition or prevent access to computers and information, in which, sometimes, the payment of a ransom is required to recover access to) (32%);
- Human error (misuse and damage to systems or destruction of documents) (20%);

- Loss of paper documents (16%);
- Identity/data theft (12%);
- Improper access (access to information for which the individual does not have permission) (4%).

53.8% of the companies surveyed affirm that they have someone responsible for information security. In 57.1% of these, the person in charge is an external worker and in 42.9% an internal employee. Looking at Figure 9 we can state that the most common area of training origin is Informatics or Information Technologies (71%). The remaining people responsible have training in Management (19.4%), Accounting (3.2%); Electronic Engineering (3.2%); and in one case an administrative (3.2%).

Figure 9 — Areas of training of the information security responsible: internal worker (N=30)



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In a comparative analysis, no relationship was identified between information security problems and the size of the company (medium, small or micro). No statistically significant relationship was also identified between the size of the company and the classification of information by access levels (public, internal, restricted or confidential). However, there was a tendency for this classification to not exist in micro-enterprises.

FINAL CONSIDERATIONS

Based on the data obtained, it is firstly important to analyze with due concern the fact that a significant percentage of companies – 60.4% – delegate the management of IS to external workers. This analysis, even considering that there is a predominance of transaction processing systems, which often carry out operational work and/or the minimum regulatory or bureaucratic work required of companies, causes the concern mentioned above, as it delegates the operation of isolated and group data, as well as digital processes, to third parties, potentially not allowing them to fully learn security routines and events. These steps are essential for understanding the minimum structuring of management in organizations and point to future studies in terms of professional training and the structuring of information technology service contracts, which allow for the inclusion of interactions and communications regarding the development and retention of procedures and routines such as security, risk sampling, and identification, the development of operational procedures, interactions with end users (aimed at receiving market signals), among others.

Secondly, there is evidence of what may be considered incipient use of social media, with a large concentration on publicizing companies (87.8%), with a smaller number considering them as channels for reaching customers, implementing an offer process with increased added value that takes advantage of digital platforms and social media as constituents of business platforms. This evidence motivates us to think, in terms of future projects, that entrepreneurs, collaborators, and business agents should be exposed to current forms of integrating services into platforms, such as the typical case of several existing businesses in the Instagram environment. Given the flexibility, relative security, and dissemination of this platform, it becomes important to understand how it can be applied for this integration, with aspects discussed below.

In the Instagram environment, as with other digital platforms and social media, there is the possibility of integrating basic content display functions – such as text, audio and video – with encouraging, planned and correctly targeted display as well as complementary functions that can add substantial value to interactions with customers. Of particular note in this regard are the

functions of payment servers, distribution and delivery, where platforms can integrate "long tailed", composite offers in a way that is transparent to customers. In this context, entrepreneurs can really focus on periodically publishing (with effective communication planning) contents about products and services, communicating with customers and offering value, while other services are included in a simpler way, using resources available in the environment itself.

In addition, there is the possibility of collecting, receiving and processing data on interactions with potential and current customers, ranging from simple summaries of "likes" and "dislikes" to powerful analytics that effectively make it possible to study routing, navigation, and decision-making patterns typical of customers browsing websites or applications.

Subsequently, we observe the adoption of physical support X paper – in conjunction with digital for storing information. These signs suggest that, in order to grow both horizontally – in terms of scale – and vertically – in terms of specialization – in terms of the value on offer, two concomitant processes should be carried out by companies: 1) digitization of collections, allowing what is already used on paper to be systematized and stored on digital media; and 2) the use of media to switch to a digital environment.

Looking at these two processes, (1) – Digitization is currently the subject of widespread discussion, as is the provision of services by third parties, and companies may be motivated, for example, to extend contracts already in force to gradually include means of digitizing collections, interactions and content arising from customer service.

With regard to the second process, (2) – Means of change, it is interesting and opportune to evaluate cloud computing offers, which are in the process of maturing, and which can offer gradual progression, starting with the immediate and basic function of integrating files and making them available through multiple, authorized and tracked access, reaching virtualization environments, where even services for composing application platforms, artificial intelligence (mainly machine learning), emulating computing environments and distributing processing are already available, including cost management, budgeting

and security mechanisms that allow entrepreneurs to spend less time and overall effort monitoring technological platforms.

Regarding information security and data privacy, a few points stand out in the results of the survey. Firstly, contrary to what one might think, information security is not synonymous with IT security. When analyzing information security and data privacy standards, especially ISO 27.001, the starting point for an efficient information security project is to analyze the business context to strategically align the organization's business, using the information obtained to improve performance and, consequently, choose the technologies that will support the entire process. In Pessoa *et al.* (2106), this relationship between information and the business, supported by technology, is evident and allows us to see that, with the right information, available to the right people, the operational result will be superior. Thus, the need for protection is vital, as it is information which will enable managers to make better decisions.

Imbued with this concept, it is somehow peculiar to notice that in the survey performed, the areas that use information technology the least for business are customer support and marketing. These are areas which need a lot of information about the market, the customer, competitors, employees and strategies, in order to create solutions (services and/or products) that are better suited to their customers' current requirements.

Another point worth of note in the analysis is the fact that 80.3% of those interviewed believe that they have never had any information security problems. It is of the utmost importance that managers undergo training in data security and privacy, to raise awareness of protection. In the majority of cases, information is assigned to people who cannot access it, not by electronic tools, but in simple informal conversations. It should also be remembered that a lot of information is on paper. Incidents of access to information on paper are increasing significantly.

The results show the reality of how companies deal with paper-based information. According to the respondents, 59.3% store paper in cupboards and/or shelves near employees' workplaces, the same percentage of companies that also do so in room(s) or space(s) dedicated to archiving information and

13.8% said that this information is stored in facilities outside the company. Data also demonstrates the situation regarding access to information: 39.8% have no rules or procedures for access, 32.5% say they have specific rules and procedures which determine what information can be accessed and by whom (for example, the need to record the consulted information, the date and who consulted it on a form) and only in 11.4% of cases is access limited by employee or by area.

This reality makes tracking access to information on paper complex, generating security incidents which, more most of the times are unnoticed by managers. Furthermore, it is always wise to remember that a "simple" email sent to the wrong recipient should be considered a security incident. With all this, it is possible to note that, if this awareness of protection concepts and greater knowledge of incidents existed, this figure of 80.3% cases would decrease exponentially.

From the point of view of security linked to information technology, some aspects also deserve attention. According to the interviewees, 44.2% of the companies surveyed store information on workers' machines, 42.5% on local servers without proper backup copies, and 22.5% on external disks (such as pen drives). These practices show that there is no basic concern for security and protection, which would be copies of information.

In no case was there any mention of information classification, business continuity plans or crisis management, which demonstrates a great opportunity for research and work in organizations that will enable them to have better control, protection and consequently better results.

Finally, as highlighted by Estrela (2016) and Pessoa (2016), the research pointed to the need to support and enable SMEs to adopt good IM and ICT practices, which support them adequately, in order to improve their performance, as well as the importance of making entrepreneurs aware of the added value of adopting these good practices. The urgency of promoting training for managers and workers (developing information and technological literacy skills) and the intervention of information managers in organizations to diagnose

problems, identify and implement the technical and technological solutions best suited to the characteristics and needs of companies were equally realized.

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About the organizers/authors

ORGANIZERS

ARMANDO MALHEIRO DA SILVA — is a Full Professor at the Faculty of Arts and Humanities of the University of Porto, specializing in Social Sciences and focusing on Information Science. In 2016, he obtained the title of Aggregate Professor at the Faculty of Arts and Humanities at the University of Porto. Prior to that, he earned his Ph.D. in History from the Institute of Social Sciences at the University of Minho in 1999. Armando Malheiro da Silva completed his undergraduate degree in History at the Faculty of Arts and Humanities of the University of Porto in 1980. Also, he obtained a bachelor's degree in Philosophy from the Faculty of Philosophy and Social Sciences at the Catholic University of Portugal in the same year.

In the academic field, Armando Malheiro da Silva has played a significant role, combining his teaching activities in Information Science courses (undergraduate, master's, and doctoral). Over the past decades, he has established relationships with universities and foreign researchers, primarily in Europe and especially in South America, with whom he has collaborated on joint projects and established attractive and advantageous partnerships for the University of Porto, particularly to Information Science courses (undergraduate, master's, and doctoral).

E-mail: armandomalheiro@gmail.com

FRANCISCO ALBERTO SEVERO DE ALMEIDA — PhD in Business Administration from the University of São Paulo (2010), and Post-doctorate from the University of Porto — Portugal (2011) and (2015). He is currently an effective professor at the State University of Goiás and leader of the Egesi Research Group — Strategy in Management, Education and Information System. It develops, together with the Department of Communication and Journalism of the University of Porto, research on the process of information management and innovation in cooperation network. Experience in Public Finance Management and Business Strategy, acting on the following sub¬jects: business cooperation and strategy, information management, socio-e¬conomic diagnosis, cooperation and innovation network, distance education and public budget.
E-mail: smfsevero@gmail.com

JORGE MANOEL ADÃO — is a permanent professor at the State University of Goiás — UEG — assigned to the University Unit of Luziânia. He currently teaches Pedagogy and Administration courses; he works in the Postgraduate Program in Management, Education and Technologies — PPGET — UEG, as a Professor and Advisor. Post-Doctor in Contemporary Technologies and Cognitive Development — PACC/UFRJ (2014). Doctorate in Education — UFRGS (2007). Master in Education — UFRGS (2002). Bachelor in Theology — ESTEF/RS (1990). Bachelor's and Licentiate Degree in Philosophy — PUC/RS (1996). He is an effective professor at the State University of Goiás (Luziânia University Unit). Leader of the Interdisciplinary Research Group in Education, Management and Regional Culture, registered in the Directory of Research Groups in Brazil, CNPq.
E-mail: jorgeadao@yahoo.com.br

MÁRIO JOSÉ BATISTA FRANCO — Professor of Entrepreneurship and SME Administration at the Department of Management and Economics, Beira Interior University, Portugal. He received his PhD in Management from Beira Interior University in 2002. In 1997, he was a doctoral candidate and participated in the European Doctoral Programme in Entrepreneurship and Small Business Management in Spain and Sweden. His research focuses on

strategic alliances, business networks, innovation and business creation. He is also a member of a Research Center (CEFAGE-UBI) and currently involved in several research projects on SMEs.
E-mail: mfranco@ubi.pt

AUTHORS

ADELSON MOREIRA SANTOS — holds a Master's degree in Management, Education, and Technology from the State University of Goiás (UEG). He is a researcher at UEG, in the GEGC Group — Interdisciplinary Research in Education, Management, and Regional Culture — UEG/Luziânia; and also a researcher at the Federal Institute of Brasília, in the GEOTECER Group: Geography, Territory, Teaching, and the Cerrado — IFB (Riacho Fundo). He is a Specialist in the Teaching of Humanities and Languages/IFB (2021); Specialist in Innovations in Interactive Media, Federal University of Goiás (2018); Specialist in Teaching and Management of Higher Education/UEG (2016). Specialist in Early Childhood Education with Emphasis on Early Grades, Integrated College of Araguatins (FAIARA) (2015). Bachelor's degree in Computer Science/UEG (2013); Pedagogue/FAIARA (2015); Bachelor's degree in History/UEG (2020). He has served as a Substitute Lecturer in the Pedagogy Course at the University Units of Silvânia and Luziânia at the State University of Goiás; Substitute Lecturer in the Administration and Pedagogy Courses at the Luziânia University Unit of the State University of Goiás. Tutor-teacher at the Network Teaching and Learning Center CEAR/UEG. Teacher at the Municipal Department of Education of Luziânia, Goiás.
E-mail: admorsan@yahoo.com.br

ADNA DOS SANTOS LEMOS — Master's student in Management, Education, and Technology at the State University of Goiás (UEG), with a degree in Biomedicine from the University Center of Brasília, in Pedagogy from FAK, and in Biological Sciences from FAFIBE. She specializes in Educational Management and Guidance (Darwin), Institutional and Clinical Psychopedagogy (FAMESC), and in Pedagogical Knowledge (Institute of Social and Human Sciences). She

has experience in public health and nutrition, clinical laboratory research on food microbiological analysis, and in education. She is currently a professor at the Municipality of Planaltina de Goiás.
E-mail: adnalemos@gmail.com.

ANA CAROLINA MARTINS SEVERO DE ALMEIDA — Graduated in Legal Sciences from the Federal District Law School, with a post-graduate degree in Public Management and a Master's degree in Management, Education and Technology from the State University of Goiás (UEG). She practices labor law in 1st and 2nd instance, and was also an assistant professor at Universidade Paulista — UNIP.
E-mail: almeida.anacarolina@gmail.com

ANA CRISTINA MARQUES DE CARVALHO — Student in the Graduate Program in Information Technology and Communication and Knowledge Management at Fumec University.

ANDRÉA KOCHHANN — Postdoctoral researcher in Education (PUC-GO). Ph.D. in Education (UnB). Master's degree in Education (PUC-GO). Specialist in University Teaching (UEG). Bachelor's degree in Pedagogy (UEG). Faculty member of the Graduate Program in Management, Education, and Technologies at the State University of Goiás (UEG) and coordinator of GEFOPI — Study Group on Teacher Education and Interdisciplinarity. She also works as an international speaker in the field of university extension.
E-mail: andreakochhann@yahoo.com.br

ARMANDO SÉRGIO DE AGUIAR FILHO — Professor in the Graduate Program in Information Technology and Communication and Knowledge Management at Fumec University.
E-mail: armando.filho@fumec.br

CAMILA DA SILVA OLIVEIRA MONTEIRO — Master in Management, Education, and Technologies from the State University of Goiás (UEG), with

a CAPES scholarship; specialist in Higher Education Teaching from Faculdade Iguaçu; and holds a degree in Pedagogy from UEG. She participated in the CAPES Pedagogical Residency Program and is currently a temporary teacher at the State Department of Education of Goiás. She is a monitor and member of GEFOPI — the Study Group on Teacher Education and Interdisciplinarity — where she develops activities focused on research and teacher training..
E-mail: camila.oliveira.ped@gmail.com

CARLA CONTI DE FREITAS — She holds a Master's degree in Language and a PhD in Public Policy, Strategies, and Development (UFRJ). She is a postdoctoral fellow in the Department of Communication and Information Sciences at the Faculty of Letters of the University of Porto (FLUP) in Portugal. She is a member of the Cerrado Network Research Group for Critical Training of Language Teachers (UFG/UNB/UEG/CNPq); the National Literacies Project: Language, Culture, Education, and Technology (USP/CNPq); and the LECCE — Literacies, Culture, Connectivity, and Education (UEG/CNPq). She is a speaker and author of national and international publications.
E-mail: carlacontif@gmail.com

CLAUDIO ROBERTO MAGALHÃES PESSOA — Civil engineer, specializing in business management and IT, telecommunication systems and computer networks engineering and telecommunication systems and computer networks management. Holds a Master's degree in Business Administration and a PhD in Information Science on Federal University of Minas Gerais. He is Lecturer and researcher at the Fumec University, developing research in the following areas: telecommunications, security information, knowledge management, strategic alignment between technical areas (Telecom, IT) and management of organizations and production engineering. He is also recognized as a consultant and analyst of information management, information security and network planning.
E-mail: cpessoa@fumec.br

ELIANE PAWLOWSKI DE OLIVEIRA ARAÚJO — Completed her PhD in Information Science in 2017 from the Federal University of Minas Gerais, Master's

in Information Science in 2013 from the Federal University of Minas Gerais, Specialization in Strategic Information Management in 2011 from the Federal University of Minas Gerais and Bachelor's degree in Business Administration in 2009 from Centro Universitário Newton Paiva. She completed a post-doctoral internship at the School of Information Science at the Federal University of Minas Gerais. Eliane is Deputy Coordinator of the research group Information and Imaginary Studies Bureau (GEDII) linked to the Postgraduate Program in Information Science at the Federal University of Minas Gerais. She is a Collaborating Researcher at the University of Porto — Center for Transdisciplinary Research Culture, Space and Memory (Citcem), and member of the Red Iberoamericana de Investigación en Imaginarios y Representaciones (RIIR.) She worked as a Collaborating Professor at the Federal University of Minas Gerais School of Information Science and as a Resident Professor at the Institute of Advanced Transdisciplinary Studies (IEAT) of the Federal University of Minas Gerais. She also works in the area of Social Sciences with an emphasis on Communication Sciences and Information Sciences; and Social Sciences with an emphasis on Management and Organization and Business Management.
E-mail: elianepaw@yahoo.com.br

FRANCISCO RAMOS DE MELO — PhD in Sciences from the Federal University of Uberlândia (2012). Master's in Eletrical and Computer Engineering from the Federal University of Goias (2003), Specialist in Computer Network from State University of Goias (1999), Specialist in Didactics and Methodology of Higher Education from Anhanguera University (2008) and a degree in Data Processing Technology from the State University of Goiás (1992). Professor and Researcher in the State University of Goiás since 1995. Professor in the Master's Program of Agricultural Engineering (PPGEA/UEG) and in the Master's Program in Management, Education and Technologies (PPGET/UEG) in the State University of Goias (UEG). Experience and research areas: Computer Science, Artificial Intelligence, Artificial Neural Networks, Intelligent Tutoring Systems, Computers in Agricultural, Artificial Intelligence in Education.
E-mail: francisco.melo@ueg.br

GEORGE LEAL JAMIL — Professor of several post-graduation courses from Minas Gerais, Brazil. He has a PhD in Information Science from the Federal University of Minas Gerais (UFMG), master degree in Computer Science (UFMG) and his graduate area was Electric Engineering (UFMG) and a pos-doctorate certificate at FLUP — Communication School at University of Porto, Portugal. He wrote more than twenty books in the information technology and strategic management areas, with more than ten works in books as co-author and Editor. Yearly, he manages the doctoral consortium of the International Conference on Information Systems and Technology Management at the University of Sao Paulo (USP) as one of his main activities. His main research interests are information systems management, strategy, knowledge management, software engineering, marketing and IT adoption in business contexts.
E-mail: gljamil@bis.com.br

GISLENE LISBOA DE OLIVEIRA — is a Post-Doctorate and PhD in Education (PUC-GO), Master in Biological Sciences (UFG) and Professor at Universidade Estadual de Goiás (UEG). She works at the Centro de Ensino e Aprendizagem em Rede (CEAR/UEG) and in the Program in Management, Education and Technologies of State University of Goiás . She has experience in Educação a Distância, educational technologies, teacher training and Biology teaching; coordinates and participates in projects and research groups, with academic production in articles, books and chapters.

ILZA MARTINS PEIXOTO LEMOS — is bachelor's degree in Language and in Pedagogy. Currently, she is a teacher of Basic Education at SEDUCE GO and she holds a master's degree in education, Technology and Management (PPGET), at the State University of Goiás, Luziânia University Unit — UEG. She also participates in the GEFOPI (Study Group on Teacher Training and Interdisciplinarity).

IVANÍSIA DIAS GALVÃO — is licensed pedagogue from Universidade Estadual de Goiás (UEG) and teacher of Educação Infantil in Distrito Federal.

JEFERSON CARVALHO MATEUS — PhD student in the Graduate Program in Society, Technology, and Environment (PPG STMA) at the Evangelical University of Goiás — UniEvangélica (ongoing since 2023). Holds a Master's degree in Management, Education, and Technology from the State University of Goiás (2022), and a Master's degree in Cultural History from the Pontifical Catholic University of Goiás (2012). Experienced in Educational Management and Distance Learning Tutoring. Professor and advisor at the Faculty of Piracanjuba — FAP.
E-mail: jefersoncarvalhomateus@gmail.com

JOSÉ LEONARDO OLIVEIRA LIMA — PhD in Information Sciences from the University of Brasília (2016). Master's in Higher Education Sciences from the University of Havana (2002), Specialist in Quality Management by the Getúlio Vargas Foundation (1997), and a degree in Computer Data Processing from the University Center of Goiás (1992). Professor in the Information Systems program at the State University of Goiás since 1999. Experience and research areas: Computer Science, with an emphasis on Information Systems; Education, with emphasis on Distance or Technology-mediated Higher Education; ICTs and education.
E-mail: jjleo@ueg.br

MARGARIDA RODRIGUES — Coordinating professor of the Management Degree at IEES, director of the IEES research, development and investigation centre and has a degree in Business Organisation and Management from the Instituto Superior de Economia e Gestão (1989); a postgraduate degree in Advanced Financial Accounting (ISTEC) — 1999; a Master's degree in Management from the Universidade da Beira Interior (2016); a PhD in Management from the Universidade da Beira Interior (2019). Integrated member of CEFAGE-UBI. She has published articles in several journals indexed in ISI and Scopus. Her research interests include networks, tourism, smart cities, creative cities, urban entrepreneurship and other types of entrepreneurship. Other areas of interest are CSR, the mining industry and management control

systems, intellectual capital, multinationals, COVID 19, management control and other topics related to management and business.
E-mail: mmmrodrigues@sapo.pt

MARIA ENEIDA DA SILVA — is PhD in Education from the Universidade de Brasília (UnB); master's degree in Education, Language and Technologies from the Universidade Estadual de Goiás (UEG); specialist in English at the Universidade Evangélica de Goiás (UniEvangélica); Letrologist and pedagogue from the UEG. Professor at UEG and researcher at Grupo de Estudos e Pesquisas sobre Formação e Atuação de Professores/Pedagogos (GEPFAPe/UnB); Grupo de Estudos sobre Formação de Professores e Interdisciplinaridade (GEFOPI/UEG); and Grupo de Pesquisa Interdisciplinar em Educação, Gestão, e Cultura Regional (GEGC|UEG).

POLLYANA PIMENTA ABUD ROLIM — has master's degree in Management, Education and Technology from the State University of Goiás (UEG). Postgraduate degree in Higher Education Teaching, English Language, Educational Guidance, Clinical Neuropsychopedagogy, Social Security Law, Civil Law and Labor Law. Degree in Languages from the State University of Goiás (UEG) and in Law from the Projection University/DF.
E-mail: pollyanaabud@gmail.com

RITA DE CÁSSIA MARTINS DE OLIVEIRA — Postdoctoral researcher in Information Science from the University of Porto, Portugal (2023), Ph.D. in Information Science from the Federal University of Minas Gerais (2016), Master's in Administration (Organizations and Human Resources) from the Federal University of Minas Gerais (2001), Bachelor's in Administration from the Federal University of Viçosa (1994). Currently serving as the Vice Chancellor for Academic Operations at UNIFACIG University Center, and also a professor for both undergraduate and postgraduate programs at UNIFACIG. Conducts research in the following areas: organizational commitment, organizational behavior, information sharing, organizational culture, people management,

quality of work life, and organizations. Additionally, holds the position of Assistant Institutional Prosecutor at UNIFACIG University Center.

SARA ANDRÉ — PhD student in Management at the University of Beira Interior in Portugal. Due to her professional background in healthcare, her research interests focus on healthcare management, strategic partnerships and value creation. She is a member of the NECE — UBI Research Centre for Business Sciences.
E-mail: sara.m.m.andre@gmail.com

SÓNIA CATARINA LOPES ESTRELA — PhD in Archival and Library Information Science (2014) from the University of Coimbra, a Master's degree in Archives, Libraries, and Information Science (2008) from the University of Évora, and an undergraduate degree in History (1999) awarded by the University of Coimbra. She also holds a postgraduate degree in Management of Business Information Systems (2017) from the Accounting and Administration Institute of Porto-Polytechnic Institute of Porto, and a postgraduate degree in Documentary Sciences — Archives (2003) and Documentation and Library (2004) from the University of Coimbra. In 2004, she began working at the Águeda School of Technology and Management — University of Aveiro (ESTGA-UA), where she is currently an assistant professor. Over the years, she has held various management positions at ESTGA: currently, she is a Member of the ESTGA-UA Board, with functions related to cooperation with society, including internship coordination, relations with external entities, and departmental coordination of the Mobility programs. Her research areas are Information Management, especially in SMEs and its impact on the decision-making process, corporate and digital communication; and, more recently, due to the performed activities and management positions, her research interests also fall within the field of internships and their impact on students.
E-mail: sestrela@ua.pt

MÔNICA ERICHSEN NASSIF — Full Professor and researcher at the School of Information Science (ECI) of the Federal University of Minas Gerais (UFMG)

since 1994. Holds a Ph.D. and Master's degree in Information Science and a Bachelor's degree in Library Science. Engages in teaching, research, and supervision of theses and dissertations in the areas of information and knowledge management, strategic information management, and competitive intelligence. Conducts research with managers of private organizations, especially small-sized ones, and public organizations from the perspective of situated and embodied cognition. Serves as the coordinator of the Research Group & quot;Cognitive Studies in Information Science — GECCI," registered with CNPq since 2003. Previously served as the Vice-Director of ECI from 2019 to 2021 and as the Head of the Department of Theory and Information Management (DTGI) at ECI from 2016 to 2019. Led the Coordination of the Undergraduate Library Science Program at UFMG from 2004 to 2008 and the Technological and Managerial Information Center (NITEG) from 2018 to 2019.
E-mail: mnassif@eci.ufmg.br

WILTON BERNARDES DA SILVA — holds a master's degree in Management, Education and Technologies (PPGET/UEG) from the State University of Goiás. He holds a bachelor's degree in Pedagogical Training for Non-Licentiate Graduates, a MBA in Network Administration (Windows) from the University Center of Araraquara (UNIARA — SP — 2013) and in Computer Network Security at FATESG (SENAI — Goiânia-GO — 2011). He holds a bachelor's degree in computer network technology from the State University of Goiás (2008). Currently a Computer Lab Technician at the Águas Lindas de Goiás Campus. He has experience in teaching (elementary, secondary, and higher education) and in Computer Science with an emphasis on Computer Networks.

ZENAIDE DIAS TEIXEIRA — Postdoctoral from the University of Brasilia in Educational Sociolinguistics. PhD in Linguistics from University of Brasilia. She is a professor of the Graduated Program in Management, Education and Technologies ofState University of Goiás.
E-mail: zenaide.teixeira@ueg.br

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Universidade Estadual de Goiás
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EGESI
Grupo de Pesquisa e Estratégia em Gestão, Educação e Sistemas de Informação

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