

Distance Learning Students' Perception of AI Teaching in Undergraduate Studies

*Percepção dos Alunos de Ensino a Distância sobre o Ensino de IA na
Graduação*

*Percepción de los estudiantes de educación a distancia sobre la
enseñanza de la IA en los estudios de pregrado*

Renata Elaine Bassi¹

renataelaine@hotmail.com

Recebido
Received
Recibido
03 nov. 2023

Aceito
Accepted
Aceptado
20 mai. 2024

Publicado
Published
Publicado
28 jun. 2024

<https://git.fateczl.edu.br>

e_ISSN
2965-3339

DOI
10.29327/2384439.2.3-2

São Paulo
v. 2 | n. 3
v. 2 | i. 3
Junho
June
Junio
2024



1 – Universidade Virtual do Estado de São Paulo

Abstract: Artificial Intelligence (AI) is one of the most significant transformations in the field of knowledge, profoundly influencing the role of education and university institutions. Distance education, the internet, and other technologies have transformed schools, where Virtual Learning Environments are essential in modern education, not only for distance learning but also for in-person and remote learning. They enable the integration of various media, facilitating interaction among students, educators, and content, enriching the educational process. ChatGPT can be considered an additional source in this learning, providing support to students in improving various skills and knowledge. For this study, research was conducted using Google Forms with students from a Distance Education Institution. The survey took place from October 23 to 30, 2023, by sharing the link in 14 WhatsApp groups of first year and second year students, with the participation of 354 students. Among them, 66% of the students are in the age group of 31 to 50 years, with a sizable portion studying Management Processes, Administration or Production Engineering. Despite 62% of the surveyed students not having studied AI, 52% of them already use ChatGPT for their studies. Therefore, it is crucial for educational institutions and professionals to be attentive and prepared for the utilization of this technology.

Keywords: Artificial Intelligence; Distance Learning; ChatGPT.

Resumo: A Inteligência Artificial (IA) é uma das transformações mais significativas no campo do conhecimento que está influenciando profundamente o papel do ensino e das instituições universitárias. A educação a distância, a internet e outras tecnologias transformaram as escolas, onde os Ambientes Virtuais de Aprendizagem são essenciais na educação moderna, não apenas para o ensino a distância, como também para o ensino presencial e remoto. Permitindo a integração de várias mídias, facilitando a interação entre estudantes, educadores e conteúdo, enriquecendo o processo educacional. O ChatGPT pode ser considerado uma fonte adicional nessa aprendizagem, oferecendo suporte aos alunos na melhoria de várias habilidades e conhecimentos. Para esse trabalho foram realizadas pesquisas usando o Google Forms com os alunos de uma instituição de ensino de Educação à Distância. A pesquisa foi realizada no período de 23 a 30 de outubro de 2023, através do compartilhamento do link em 14 grupos do WhatsApp dos alunos de 1º e 2º ano do curso, onde se obteve a participação de 354 alunos. Desses, 66% dos alunos estão na faixa etária de 31 a 50 anos, além da grande parte estarem cursando Processos Gerenciais, Administração ou Engenharia da Produção. Apesar de 62% dos alunos entrevistados não terem estudado sobre IA, 52% dos alunos entrevistados já utilizam o ChatGPT para estudarem. De modo que, é primordial que as instituições de ensino

e que os profissionais estejam atentos e preparados para a utilização dessa tecnologia.

Palavras-chave: Inteligência Artificial; Ensino EAD, ChatGPT.

Resumen: *La Inteligencia Artificial (IA) es una de las transformaciones más significativas en el campo del conocimiento que está influyendo profundamente en el papel de las instituciones docentes y universitarias. La educación a distancia, internet y otras tecnologías han transformado las escuelas, donde los Entornos Virtuales de Aprendizaje son esenciales en la educación moderna, no solo para el aprendizaje a distancia, sino también para la enseñanza presencial y remota. Permitiendo la integración de diversos medios, facilitando la interacción entre alumnos, educadores y contenidos, enriqueciendo el proceso educativo. ChatGPT puede considerarse una fuente adicional en este aprendizaje, ya que ofrece apoyo a los estudiantes en la mejora de diversas habilidades y conocimientos. Para este trabajo se realizó una investigación utilizando Google Forms con estudiantes de una institución educativa de Educación a Distancia. La investigación se realizó del 23 al 30 de octubre de 2023, a través de la compartición del enlace en 14 grupos de WhatsApp de estudiantes de 1° y 2° año del curso, donde participaron 354 estudiantes. De estos, el 66% de los estudiantes se encuentran en el grupo de edad de 31 a 50 años, además de que la mayoría de ellos estudian Ingeniería de Procesos de Gestión, Administración o Producción. Aunque el 62% de los estudiantes encuestados no ha estudiado IA, el 52% de los estudiantes encuestados ya utiliza ChatGPT para estudiar. Por ello, es fundamental que las instituciones educativas y los profesionales estén concienciados y preparados para el uso de esta tecnología.*

Palabras clave: *Inteligencia artificial; Aprendizaje a distancia, ChatGPT.*

1. INTRODUCTION

Humanity has been the protagonist of countless inventions in its relentless pursuit of creating and improving tools. Periodically, significant changes occur, causing a profound impact on human life and triggering irreversible societal transformations (GATTI, 2019).

As noted by Tozetto Neto (2023), technology is not a recent phenomenon, but a continuous process that has accompanied human history since its early stages. Over the centuries, technology has evolved from rudimentary tools to sophisticated electronic devices, and this evolution continues to shape our present and future.

Undoubtedly, the term “Artificial Intelligence” has gained increasing relevance in all areas of knowledge. Despite being used for the first time more than 60 years ago, various concepts and interpretations have arisen from this field, which is still considered new and complex. Technological evolution has driven artificial intelligence to new heights, continually challenging and expanding our understanding of what is possible within this fascinating and multifaceted field (VASCONCELOS, 2022).

One of the most significant transformations in the field of knowledge is profoundly influencing the role of teaching and university institutions. This is due to the growing importance of the sub-area of research in artificial intelligence known as “machine learning.” This approach aims at increasing automation and continuous innovation in research and training, responding to the demands of both productions, on the one hand, and flexible consumption, on the other. This trend redefines educational priorities and teaching methods, shaping a future in which technology will play a central role in education and society (CAMPOS and LASTÓRIA, 2020).

Distance learning, the internet, and other technologies have transformed schools, generating unrest and changes due to the demands of educational policies. However, acquiring technology is only a prominent part of this revolution. Education is now a central economic challenge in the new development model (LIBÂNEO, OLIVEIRA, and TOSCHI, 2012).

This article aims to investigate the perception of students at a public higher education institution specialized in distance learning, regarding the role of Artificial Intelligence in their learning process and its potential impact on their future professional use.

2. THEORETICAL BASIS

2.1. DISTANCE LEARNING

According to Vasconcelos (2022), Virtual Learning Environments (VLEs) are not just essential, but empowering for distance learning and in-person and remote teaching in modern education. They allow the integration of various media,

facilitating interaction between students, educators, and content, enriching the educational process in different contexts. According to Alves et al. (2021), these platforms represent a significant trend in information technology, primarily to facilitate teaching and learning in virtual environments.

According to Costa, Feitosa Filho, and Bottentuit Júnior (2019), the VLE offers a platform where educators can share content and activities while students interact, participate in discussions, and access learning resources in an organized manner. This system facilitates distance learning, creating a digital environment conducive to interactive teaching and collaborative learning.

As Garcia et al. (2020) mentioned, in remote teaching, it is essential to develop proactive, inventive, responsible, and committed attitudes and skills in students to cover the learning curve effectively. The changes in remote teaching involve transformations in communication, the use of technology, and planning, requiring the determined construction of these skills for student success. In remote teaching, students can use various resources, including digital technologies and virtual media, to validate information, research, communicate, and collaborate. These tools provide flexibility and accessibility, allowing adaptive and collaborative learning and creating rich and interactive educational experiences.

According to the author, one example is WhatsApp on smartphones, which serves as a communication tool and transforms into a virtual classroom. It allows the exchange of messages, voice calls, and video calls, facilitating group discussions, interactive classes, and collaboration between students, expanding the limits of traditional learning. In other words, it transcends the physical barriers of classrooms, inserting students into a dynamic virtual learning environment.

2.2. INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)

Information and Communication Technologies (ICTs) play a fundamental role in education, transforming how we learn and teach. Authors such as Tori (2009), Litto and Formiga (2009), and Munhoz (2016) mention the importance of ICTs in the teaching-learning process by introducing new strategies and providing a more dynamic and interactive education.

Parreira, Lehmann, and Oliveira (2021) cite some less positive aspects regarding using ICTs in education, such as the rapid speed of information exchange, which can become an obstacle to in-depth analysis. In addition, the affectivity associated with superficial analyses can distort the view of reality. The difficulty distinguishing between what is essential and what is dispensable can lead to weak motivation or even the absence of it in the educational process. These challenges highlight the importance of critical approaches when using ICT in

education, ensuring that these tools are applied effectively and meaningfully to provide genuinely enriching learning.

Also, according to the authors, the communication technologies currently in use are Facebook, Instagram, and WhatsApp, among others, which contribute to the continuous exchange of ideas and information among students. Teachers can also extend this technology to their communication. According to Fernandes, Henn, and Kist (2020), ICTs should be integrated into the relationship between students, teachers, and the contexts surrounding them, helping course participants reflect on the construction of knowledge and the context in which they are inserted.

2.3. ARTIFICIAL INTELLIGENCE

The potential of Artificial Intelligence (AI) is vast, involving data that can significantly impact various areas of society. As people incorporate new technologies into their daily lives, it becomes essential to use AI to contribute to various spheres, offering promising solutions and advancements (MATOS, 2022).

Vasconcelos (2022) mentions that during the 1950s, AI was committed to reproducing human intelligence in machines. The initial milestone in the history of AI occurred in 1951 when Christopher Strachey developed the first successful AI program. However, Gatti (2019) reports that the term was initially used by John McCarthy in 1956 when he presented it to the academic community during a conference at Dartmouth College in New Hampshire.

As Pozzebon, Frigo, and Bittencourt (2004) mention, the advancement of AI has been closely linked to the progress of computers since the mid-20th century. Through these machines, it has become possible to simulate several particularities of human intelligence, raising questions about the ability of machines to be as intelligent as humans and to learn.

According to the authors, AI was recognized as a science in 1956. However, its object of study remains enigmatic since a fully satisfactory definition of intelligence has yet to be developed. Controlling the concepts related to human intelligence and knowledge is essential to understanding AI processes and knowledge representation.

As Silva and Gonsales (2018) and Gomes (2023) point out, AI is a branch of computer science dedicated to the creation of algorithms and systems capable of imitating human intelligence. Its central objective is the development of programs that assist humans in making more informed decisions and choices.

As technology advances and machines become more sophisticated, AI has the potential to revolutionize the way we live and interact. This potential is not just theoretical, but a tangible reality that is already shaping our world. It occurs

through the use of data and parameters aligned with the language models we wish to explore (GOMES, 2023).

AI refers to performing various actions that include planning, reasoning, problem-solving, perception, presentation of knowledge, and creativity, among others (MECAJ, 2022). This definition highlights the versatility of artificial intelligence in imitating activities that require human intelligence. It's not just about imitating, but about integrating into complex systems to enable intelligent actions in different contexts, a feat that is truly impressive.

According to Gatti (2019), AI stands out for its ability to handle and analyze large volumes of data, structured or unstructured, on a scale that the human brain would not be able to process. This is not just a matter of quantity, but also of speed and efficiency. Surprisingly, it operates following patterns similar to those the human mind would use, making it an actual artificial "super brain."

According to Soares (2023), it is essential to remember that the advancement of AI can lead to profound transformations in the job market. Companies, professionals, and governments must collaborate to investigate the possibilities of AI, thus enabling sustainable and inclusive development of the job market. This automation cannot completely replace human labor because technological tools do not have the same ability to adapt and solve problems that human beings do.

2.4. WHATSAPP

Lima et al. (2022) mention that Brian Acton and Jan Koum created the WhatsApp application in 2009 exclusively for iPhone technology. However, given its enormous success, it was expanded to Android system technology. With enormous acceptance, in the first year, it reached the mark of 450 million users. MarketSplash (2023) states that WhatsApp has over 2 billion users worldwide.

As mentioned by Blauth, Dias, and Cherer (2019), interaction only occurs when the smartphone is connected to the internet. The same occurs when using the WhatsApp Web version; the device must be connected. This version facilitates typing using a conventional keyboard, which reduces response time in discussions.

According to the author, WhatsApp has been mediating distance learning, offering several possibilities for education and learning. The possibility of forming groups for specific topics, exchanging instant messages, and sending different types of files and backups of shared content (BLAUTH, DIAS, and SCHERER, 2019; CESANA, DURÃES, and CARDOSO, 2022). Currently, WhatsApp groups have the capacity for 1024 participants.

2.5. CHATGPT

ChatGPT is a language model developed by OpenAI that uses deep neural networks to process large volumes of text, generating personalized and

contextualized responses to users' questions. It refers to an artificial intelligence method that examines human language by reading mathematically processed texts in an extensive database. This process provides increasingly accurate and relevant responses, making it a versatile and powerful tool for various applications, including education (GOMES, 2023).

Artificial Intelligence's use in the ChatGPT tool by different agents in society has generated great debates and perceptions regarding its purpose and effectiveness. Gomes (2023) highlights that ChatGPT spent 2021 "learning" and processing billions of pieces of information from the internet worldwide. People released it for use at the end of 2022. It is essential to know that it is susceptible to error.

As noted by Sok and Heng (2023), ChatGPT can be considered an additional source of learning and obtaining information, offering support to students in improving various skills and knowledge in different areas. Its vast amount of information, combined with intelligent processing, facilitates the process of generating ideas for the creation of articles, reports and theses. Providing students with valuable assistance in their academic activities.

However, the authors also point out the risk of this technology being too easy to use, which could result in significant dependence, limiting users to the information provided by ChatGPT without the need to subsequently verify its veracity. It could also lead to the loss of critical thinking skills, investigative capabilities, and independent problem-solving.

Soares (2023) emphasizes that the clearer the question, the more accurate the answer will be, so that the accuracy of the information increases with the quality of the data provided. Kalla and Smith (2023) add that the model also does not have the ability to understand and interpret the emotions and intentions behind the words, making it impossible to respond to emotional signals.

As mentioned by Santos et al. (2023), it is crucial that this technology be used to improve and complement existing pedagogical practices, instead of replacing or devaluing them.

As detailed by Soares (2023), the adoption of ChatGPT in the business scenario has become exponentially more common and can prove to be an invaluable tool for improving internal communication, boosting productivity, and facilitating the decision-making process in a company.

3. MATERIALS AND METHODS

The decision to choose the method to be followed is of great importance, as this method defines the path to achieving the desired results in the research, that is, the effectiveness of the work (CERVO, BERVIAN, and SILVA, 2007).

Bibliographic research is one of the most common activities in developing studies and academic works. Through this type of research, it is possible to find ways to explain and discuss theoretical information published in books and specialized journals on the subject or theme in question.

As presented by Nascimento (2012), the selection of bibliography plays a fundamental role in the construction of arguments and in representing the theme in question. Gil (2018) mentions that the main advantage of bibliographic research is the ability to investigate much broader dimensions and occurrences than would be possible through direct research.

Bibliographic research was carried out in books, academic articles, specialized magazines, and course completion papers. As Gil (2018) highlights, reading implies that bibliographic research must align with the objectives, information, and data of the problem presented and analyze the consistency of the information provided by the authors.

As Nascimento (2012) noted, the questionnaire has the advantage of reaching many interviewees. It is crucial to present the questionnaire clearly to ensure the responses align with the established objectives. In addition, the test, a variant of the questionnaire, can be applied to measure specific aspects relevant to the scope of the study in question.

In quantitative research, the focus is on quantifying the data found. It is essential to use statistical techniques, such as percentages, averages, and standard deviations, to ensure the objectivity of the study and rule out possible influences by the researcher on the results (MASCARENHAS, 2012).

For this study, surveys were conducted using Google Forms with students from an educational institution specializing in distance learning, which is present in more than 300 cities in the State of São Paulo. This institution offers specific courses in 3 axes. The Business Axis includes the courses of Technologist in Management Processes, Bachelor in Administration, and Bachelor in Production Engineering. The Bachelor's Degree Axis includes Languages, Mathematics, and Pedagogy courses. The Computing Axis includes courses such as a Bachelor in Information Technology, a Bachelor in Data Science, and a Bachelor in Computer Engineering.

Since this is a distance learning teaching method, students interact with each other through WhatsApp groups. The survey was conducted from October 23 to

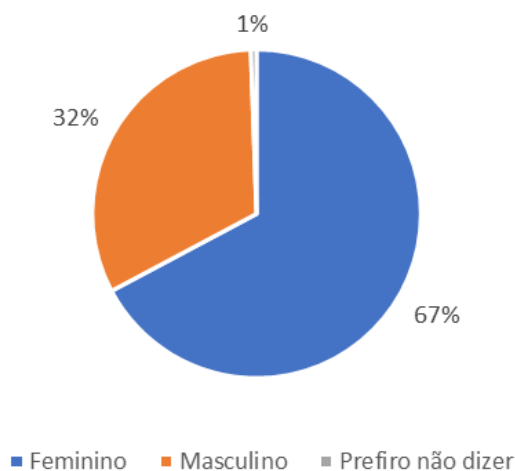
30, 2023, by sharing the survey link in 14 student WhatsApp groups, covering only 1st and 2nd year students, and 354 students responded.

4. RESULTS AND DISCUSSION

Question: "What is your gender?"

Of the 354 students interviewed, 238 declared themselves to be female, 67% of the interviewees, and 114 declared themselves to be male, corresponding to 32% of the interviewees. Two students preferred not to say, corresponding to 1% of the interviewees, as shown in Figure 1.

Figure 1 - Gender of the students interviewed



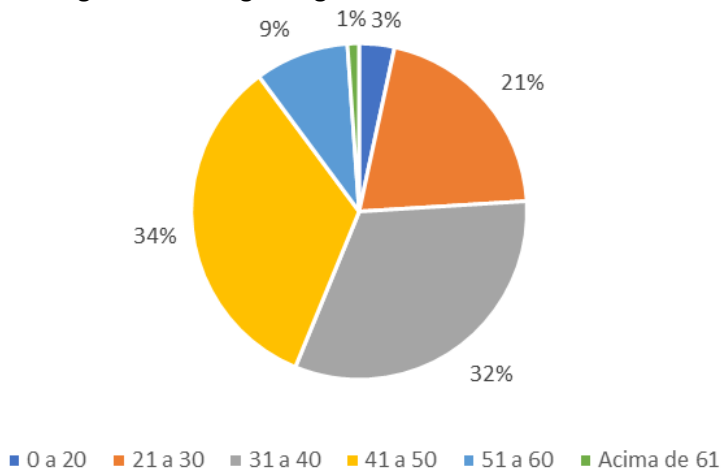
Source: Authoress (2023).

When asked, "What is your age range?"

Of the students interviewed, 12 stated that they were between 0 and 20 years old, corresponding to 3% of the students interviewed; 73 students stated that they were between 21 and 30 years old, corresponding to 21% of the students interviewed; 114 students stated that they were between 31 and 40 years old, corresponding to 32% of the students; 119 students stated that they were between 41 and 50 years old, corresponding to 34% of the students; 32 students stated that they were between 51 and 60 years old, corresponding to 9% of the students; 4 students stated that they were over 61 years old, corresponding to 1% of the students interviewed. This fact can be seen in Figure 2.

As shown in Figure 2, 66% of the students interviewed were between 31 and 50 years old, an age group already in the job market.

Figure 2 - The age range of the students interviewed

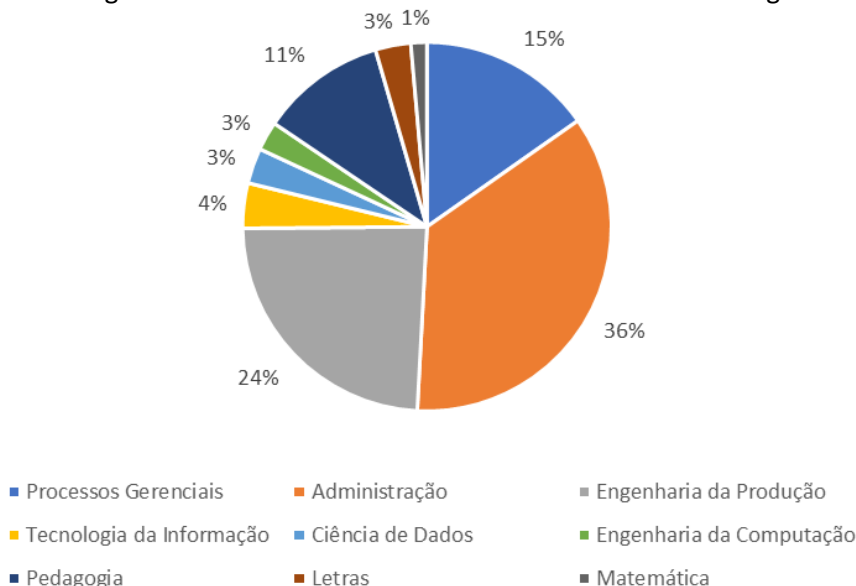


Source: Authoress (2023).

When asked: “What is your major?”

Of the students interviewed, 126 declared that they were studying for a Bachelor’s degree in Business Administration, corresponding to 36% of the students; 11 declared that they were studying for a Bachelor’s degree in Data Science, corresponding to 3% of the students; 8 declared that they were studying for a Bachelor’s degree in Computer Engineering, corresponding to 3% of the students; 85 declared that they were studying for a Bachelor’s degree in Production Engineering, corresponding to 24% of the students; 11 declared that they were studying for a Bachelor’s degree in Languages, corresponding to 3% of the students; 5 declared that they were studying for a Bachelor’s degree in Mathematics, corresponding to 1% of the students; 39 declared themselves to be studying Pedagogy, corresponding to 11% of the students; 54 declared themselves to be studying Management Processes Technology, corresponding to 15% of the students and 14 declared themselves to be studying Information Technology, corresponding to 4% of the students, as shown in Figure 3.

Figure 3 - Courses that the students interviewed are taking.

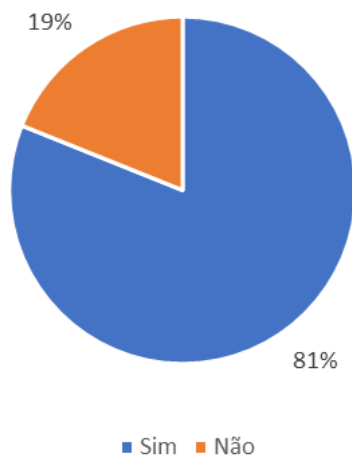


Source: Authoress (2023).

Asked: "Do you know what Artificial Intelligence is?"

According to Figure 4, of the students interviewed, 287 answered Yes, corresponding to 81% of the students; 67 answered No, corresponding to 19%.

Figure 4 - Knowledge about AI of the interviewees

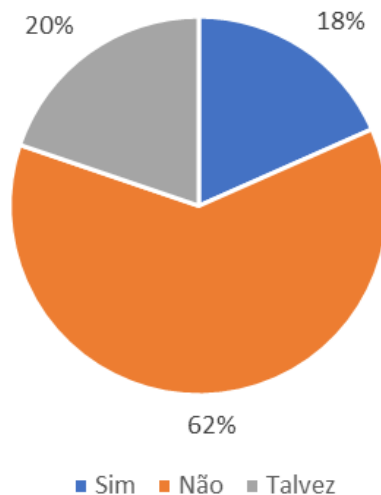


Source: Authoress (2023).

Asked: "Did you have any course on Artificial Intelligence in your course?"

Of the students interviewed, 219 answered No, corresponding to 62% of the total survey; 65 answered Yes, corresponding to 18% of the students interviewed; 70 students answered Maybe, corresponding to 20% of the students interviewed, as shown in Figure 5.

Figure 5 - Student interviewed studied AI



Source: Authoress (2023).

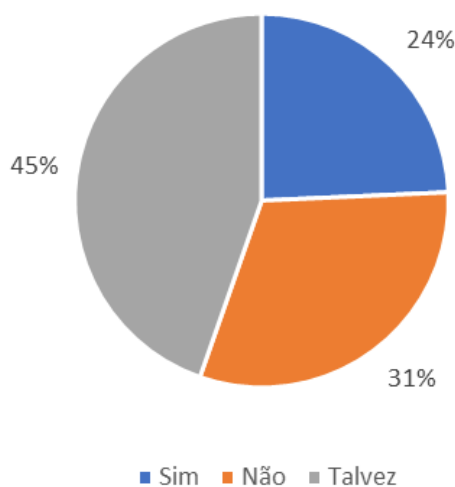
According to Figure 5, 20% of the students interviewed responded that they may have studied some subject related to Artificial Intelligence. This is a significant number in the survey due to the students' indecision about whether or not they

have studied it, leading them to question the clarity of the content presented to them.

When asked, "In the curriculum of your course, is there any subject related to Artificial Intelligence?"

According to Figure 6, 110 of the students interviewed responded No, corresponding to 31% of the total survey; 86 responded Yes, corresponding to 24% of the students interviewed; and 158 students responded Maybe, corresponding to 45% of the students interviewed.

Figure 6 - Knowledge of AI in the curriculum



Source: Authoress (2023).

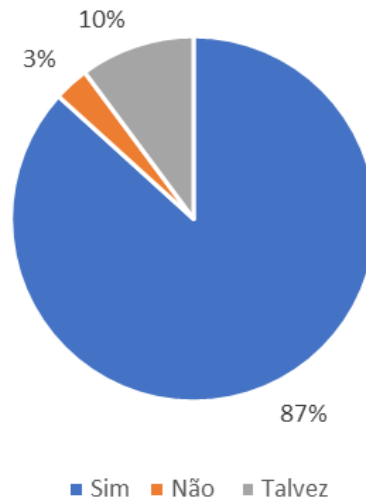
According to the institution's website, students in the Computing Axis do not have any subject called "Artificial Intelligence"; however, the bachelor's degree in data science has the subject "Neural Networks" in the seventh semester, whose content is about Artificial Intelligence. Students in the bachelor's degree, despite all being related to the training of professionals who will work in the field of education, none of the courses have the subject of Artificial Intelligence. Finally, students in the Business Axis, only the Administration course, will have the subject "Impacts of Artificial Intelligence" in the last semester of the course (UNIVESP, 2023).

Another point to be noted is that 45% of students need to know if their course curriculum includes any subject related to Artificial Intelligence. The curriculum of the institution's courses is available on the main page of the University's website, demonstrating a lack of knowledge and interest in the subjects offered to them during their academic training. When asked, "Do you think addressing Artificial Intelligence in your course is important?"

Of the students interviewed, 11 answered No, corresponding to 3% of the total survey; 307 answered Yes, corresponding to 87% of the students interviewed;

and 36 students answered Maybe, corresponding to 10% of the students interviewed, as shown in Figure 7.

Figure 7 - Importance of addressing AI in undergraduate courses



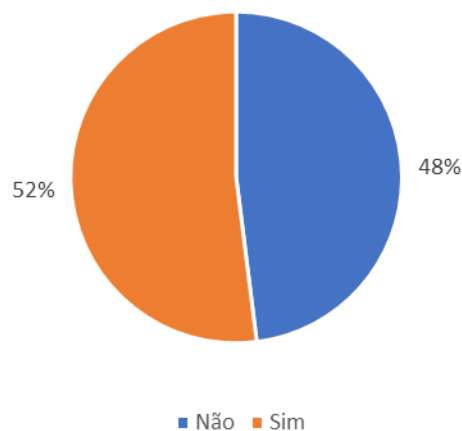
Source: Authoress (2023).

As seen in Figure 7, although many students see the importance of the Artificial Intelligence approach in undergraduate courses, what is striking is that 10% do not know if it is important and that 3% of the students, that is, 11 interviewees, state that it is not important, even in the face of all the existing technological advances.

When asked, “Do you use Artificial Intelligence websites (ChatGPT) to study?”

According to Figure 8, 170 of the students interviewed answered No, corresponding to 31% of the total survey; 184 answered Yes, corresponding to 24% of the students interviewed.

Figure 8 - Using ChatGPT to study

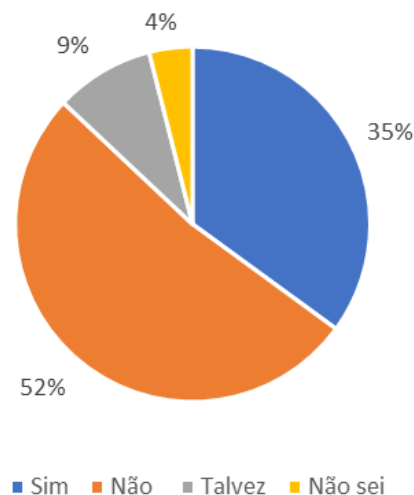


Source: Authoress (2023).

As shown in Figure 8, more than half of the students at this higher education institution use ChatGPT to study.

When asked, “Do you use Artificial Intelligence websites (ChatGPT) for work?” Of the students interviewed, 184 answered No, corresponding to 52% of the total survey; 124 answered Yes, corresponding to 35% of the students interviewed; 32 answered Maybe, corresponding to 9%; and 14 students answered They did not know, corresponding to 4% of the interviewees, as shown in Figure 9.

Figure 9 - Using ChatGPT for work



Source: Authoress (2023).

5. CONCLUSION

Artificial Intelligence is nothing new; it has been a constant presence in various spheres of society since the 1950s. However, the educational sector urgently needs to be aware of advances in technology to verify the importance of including this subject in its curriculum. Educational institutions need to not only adopt AI but also guide students so that they can develop their leading role in learning. It is essential to encourage students to build their knowledge and, at the same time, develop critical skills.

More important than the use of AI in education is its role in the job market. Therefore, the inclusion of this technology in educational curricula from the first semesters of the course is crucial in preparing students for their future careers.

ChatGPT offers personalized answers and support for students, which is essential for Distance Education students who often do not have their questions answered by a teacher. However, excessive use can lead to dependence and loss of critical thinking, so it should be used in moderation.

Distance learning is often lonely, and using tools such as WhatsApp provides a refuge, overcoming physical barriers and promoting integration among students who do not have a classroom to share. In the case of this research, integrating

students from groups often located beyond the center where they study, but instead, spread across more than 300 cities in the state of São Paulo.

It is crucial to understand that despite all the potential that AI must transform the job market, its technological limitations can prevent a total replacement of human labor. This underscores the need for a careful and balanced integration of its use, which is essential for a productive and sustainable future.

Therefore, educational institutions and professionals must be aware of and prepared to use this technology. It is also essential to explore the benefits of AI while preserving the unparalleled value of human labor.

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