International Journal of Innovation

e-ISSN: 2318-9975
https://doi.org/10.5585/2024.26378
Received: 04 Apr. 2024 - **Approved:** 13 Apr. 2024

Evaluation Process: Double Blind Review
Editor-in-Chefe: Priscila Rezende da Costa
Co editor: Isabel Cristina Scafuto
Scientific Editor: Vânia Maria Jorge Nassif
Assistant Editor: Angelica Pigola
Section: Perspective

Check for updates

Morality and Modeling of Intention to use Chatgpt Technology

André Torres Urdan[1] and Celise Marson[2]

[1] PhD. Universidade Nove de Julho (UNINOVE) / São Paulo, SP – Brazil.

andre.torres@uni9.pro.br

[2] Master's degree. Universidade Nove de Julho (UNINOVE) / São Paulo, SP – Brazil.

marsoncelise@uni9.edu.br

Authors' Notes

We have no conflicts of interest to disclose.

Correspondence concerning this article should be addressed to Celise Marson - marsoncelise@uni9.edu.br

Cite as – American Psychological Association (APA)

Urdan, A. T., & Marson, C. (2024, Jan./Apr.). Morality and Modeling of Intention to Use Chatgpt Technology. *International Journal of Innovation - IJI*, São Paulo, *12*(1), p. 1-42, e26378. https://doi.org/10.5585/2024.26378

Abstract

Research Objective: the main objective in this article is to identify new variables that can improve a Proposed Integrative Model (PIM) for ChatGPT adoption. PIM, in turn, is based on three consolidated theories: TAM (Technology Acceptance Model), DIT (Diffusion of Innovation Theory) and TCMD (Theory of Cognitive Moral Development).

Methodology/Approach: the approach in this study is qualitative, with interviews from experts who use ChatGPT in their areas, including three journalists, two technology professionals and three teachers. The interview guide involved the three theories. Textual data is analyzed with AtlasTi. software.

Originality/Relevance: the research address doubts and fears about ChatGPT, an emerging technology highlighted in several fields, including Education. The results describe and interpret several influences (for example: psychological, social and technological) on the use of ChatGPT, in a nation (Brazil) with one of the largest populations in the world.

Main Results: we identified 16 new variables potentially influential in the use of ChatGPT: accessibility, access to connectivity, trust in technology, creativity, entertainment, expectations, previous experience, feedback and continuous improvement, perceived innovation, integration with existing systems, time saving, customization, reduction workload, perceived risk, satisfaction and safety. Three aspects emerged around morality: intrinsic relationship between morality and ChatGPT: (i) attributing responsibility to the company OpenAI; (ii) intimate nature, intrinsic and individual characteristic of morality as an independent element of any technology; (iii) practice of reproducing content, historically considered illegal, which does not represent anything new from a legal point of view, regardless the technological era.

Theoretical/Methodological Contributions: the identified variables not only broaden but also improve the general understanding of ChatGPT adoption.

Keywords: ChatGPT, artificial intelligence, chatbot, natural language processing

Moralidade e Modelagem da Intenção de Uso da Tecnologia ChatGPT

Resumo

Objetivo da pesquisa: identificar novas variáveis que possam aprimorar um Modelo Integrativo Proposto (MIP) de adoção do Chat GPT. O MIP, por sua vez, se baseia em três teorias consolidadas: TAM, TDI e DMC.

Metodologia/abordagem: é qualitativa, com entrevistas de especialistas, que empregam o ChatGPT em suas áreas, sendo três jornalistas, dois profissionais da área de tecnologia e três docentes. O roteiro de entrevista envolve as três teorias. Os dados textuais são analisados com o software AtlasTi.

Originalidade/Relevância: abordar dúvidas e receios em torno do ChatGPT, uma tecnologia emergente em destaque em diversos campos, incluindo o da Educação. Os resultados descrevem e interpretam diversas influências (psicológicas, sociais e tecnológicas) no uso do ChatGPT, numa nação (Brasil) com uma das maiores populações do mundo.

Principais resultados: identificadas 16 novas variáveis potencialmente influentes no uso do ChatGPT: acessibilidade, acesso à conectividade, confiança na tecnologia, criatividade, entretenimento, expectativas, experiência prévia, feedback e melhoria contínua, inovação percebida, integração com sistemas existentes, otimização do tempo, personalização, redução da carga de trabalho, risco percebido, satisfação e segurança. Despontaram três aspectos em torno da moralidade: relação intrínseca da moralidade com o ChatGPT, atribuindo responsabilidade à

empresa OpenAI; natureza íntima, característica intrínseca e individual da moralidade como um elemento independente de qualquer tecnologia; prática de reprodução de conteúdo, historicamente considerada ilegal, que não representa uma novidade sob o ponto de vista legal, independentemente da era tecnológica.

Contribuições teóricas/metodológicas: as variáveis identificadas não só ampliam, como melhoram a compreensão da adoção do ChatGPT.

Palavras-chave: ChatGPT, inteligência artificial, chatbot, processamento de linguagem natural

Moralidad y Modelado de la Intención de uso de la Tecnología ChatGPT

Resumen

Objetivo de la Investigación: identificar nuevas variables que puedan mejorar un Modelo Integrativo Propuesto (PIM) para la adopción del Chat GPT. El PIM, a su vez, se basa en tres teorías consolidadas: TAM, DIT y TCMD.

Metodología/Enfoque: es cualitativa, con entrevistas a expertos que utilizan ChatGPT en sus áreas, incluidos tres periodistas, dos profesionales de la tecnología y tres docentes. El guion de la entrevista abarca las tres teorías. Los datos textuales se analizan con el software AtlasTi.

Originalidad/Relevancia: abordar dudas y temores en torno al ChatGPT, una tecnología emergente destacada en diversos campos, incluida la Educación. Los resultados describen e interpretan diversas influencias (psicológicas, sociales y tecnológicas) en el uso del ChatGPT, en una nación (Brasil) con una de las mayores poblaciones del mundo.

Principales Resultados: se identificaron 16 nuevas variables potencialmente influyentes en el uso del ChatGPT: accesibilidad, acceso a la conectividad, confianza en la tecnología, creatividad, entretenimiento, expectativas, experiencia previa, retroalimentación y mejora continua,

percepción de innovación, integración con sistemas existentes, optimización del tiempo, personalización, reducción de la carga de trabajo, percepción de riesgo, satisfacción y seguridad. Surgieron tres aspectos en torno a la moralidad: la relación intrínseca de la moralidad con el ChatGPT, asignando responsabilidad a la empresa OpenAI; la naturaleza íntima, característica intrínseca e individual de la moralidad como un elemento independiente de cualquier tecnología; la práctica de la reproducción de contenido, históricamente considerada ilegal, que no representa una novedad desde el punto de vista legal, independientemente de la era tecnológica. **Contribuciones Teóricas/Metodológicas:** las variables identificadas no solo amplían, sino que también mejoran la comprensión de la adopción del ChatGPT.

Palabras-clave: ChatGPT, inteligencia artificial, chatbot, procesamiento del lenguaje natural

Introduction

Natural Language Processing (NLP) is a branch of Artificial Intelligence (AI) in computing which operates with language similar to that used by people in the daily communications they make with each other. The functional possibilities of NLP include sentiment analysis, speech recognition, machine translation, text generation and summarization, among others (Tingiris & Kinsella, 2021; Kublick & Saboo, 2023).

ChatGPT is a general-purpose NLP system, capable of performing any functions possible with this type of processing. The Generative Pre-Trained Transformer (GPT) is a statistical language model that calculates the probability distribution of a sequence of words. Thus, GPT estimates and decides which text to present as a response (called conclusion) to a prompt given

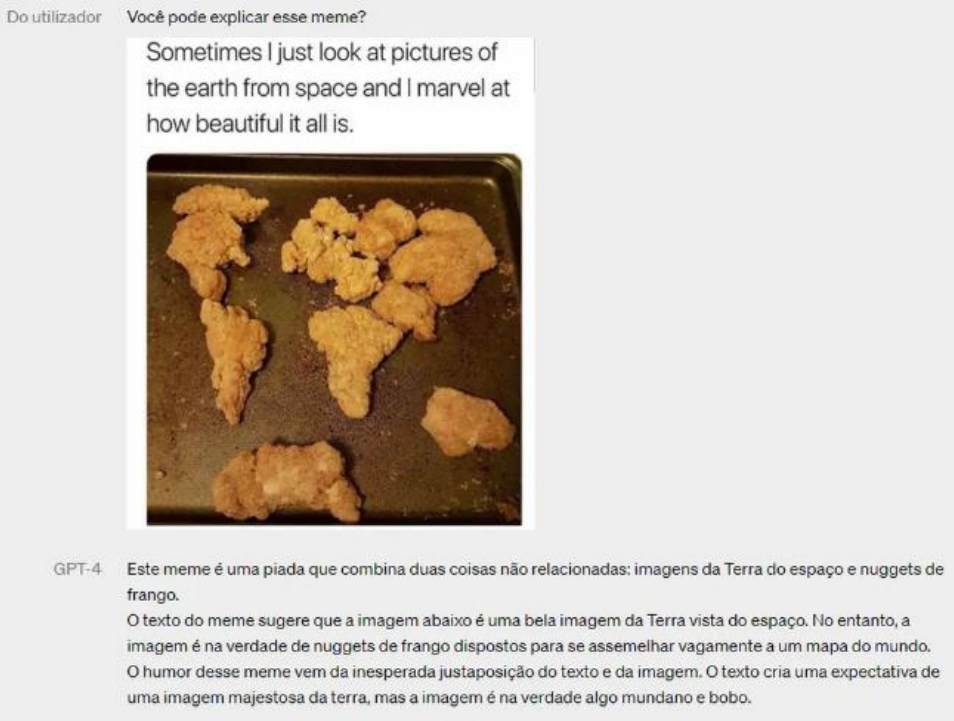
to it by a human being (stimulus). The quality of the conclusion depends on the prompt (Tingiris & Kinsella, 2021).

In a hypothetical example, a person wants to improve their persuasiveness when negotiating. This individual may insert a description of the situation into ChapGPT, with the objectives sought, and request suggestions (the prompt). ChatGPT will calculate the probability distribution of a sequence of words to generate a conclusion to that prompt and then it suggests means of persuasion (the conclusion). The better the prompt (accurate, complete and with relevant information), the better the suggestions issued by ChatGPT.

Figure 1 shows an example from OpenAI itself, the prompt asks for an explanation of a meme, made up of text and image. The conclusion points out unusual elements in this 'entry' (OpenAI, 2023).

Figure 1

Screenshot of ChatGPT4 with a query and its response



Source: OpenAI (2023)

ChatGPT technology also involves risks, such as inappropriate results and malicious use (Santos & Neves, 2023). To prevent misuse, according to OpenAI, they created a guideline on the types of content that prevents misuse. Thus, a person can use ChatGPT and it offers a free content filter, with a view to avoiding, for example, use in disinformation campaigns. OpenAI's mission (2023) is to "ensure that artificial intelligence benefits all of humanity". However, the mission is an aspiration, which will not necessarily come true, because this depends on other factors and agents in its environment.

The advancement of AI brings a series of impacts on society. There are issues such as copyright, dissemination of misinformation, excessive dependence on technology, risk of misuse, environmental impacts (training complex AI models consume large amounts of energy and computational resources, contributing to excessive energy consumption and increased carbon emissions). Besides, AI automation and efficiency could lead to large-scale layoffs in certain sectors, causing economic and social instability. Furthermore, it can be used for malicious purposes, such as creating fake news, terrorism and sophisticated scams. In short, there are several fears surrounding this advance (Rocha, 2023; Arévalo & Quinde, 2023; Eloundou et al., 2023).

Regarding copyright, the use of ChatGPT raises legal doubts, as it does not indicate the sources consulted to formulate its conclusions. The spread of misinformation is another critical issue, as ChatGPT can easily create false or misleading information harming society. Excessive dependence on technology is a growing concern as AI becomes more integrated into people's lives, reducing their ability to solve problems and making them more dependent on automated systems (Almeida, Aguiar, & Magalhaes, 2023; Cargnelutti et al. 2023).

A more essential question involves the variables that influence the use of ChatGPT. In this context, psychological influences play a significant role (Olivos, 2023). People tend to use the technology if they believe it meets their individual needs, providing useful information for solving problems. Trust also plays a crucial role in this use, as individuals need to trust that the information provided by ChatGPT will not lead them to make decisions that are harmful to themselves or society (Sirdeshmukh, Singh, & Sabol, 2002). Additionally, social influences also affect ChatGPT adoption. Individuals tend to use it if the social group they belong to uses it as well, especially if third parties have positive experiences with ChatGPT (Olivos, 2023).

There are also potential technological influences. The integration of ChatGPT with other technologies increases the usefulness and attractiveness of the solution. Availability on multiple platforms makes it more accessible. Continuous improvements in ChatGPT technology allow for more effective interaction with users, increasing its usefulness over time (Guimarães et al., 2024). Overall, whether or not to use ChatGPT should depend on a complex interplay of psychological, social, and technological influences. The variables that influence this process requires examining the literature and, beyond it, investigating the empirical reality of people in the face of ChatGPT in each country. In this direction, the literature was reviewed and is described in the following section.

Literature Review

In this section, we review the literature on ChatGPT, TAM (Technology Acceptance Model), restrictions on the TAM, DIT (Diffusion of Innovation Theory) and TCMD (Theory of Cognitive Moral Development). Finally, the review investigates the Proposed Integrative Model (PIM), which combines elements of the three previous theories in influencing the adoption and use of technology (in general) and ChatGPT (in particular).

ChatGPT

AI is the simulation of human intelligence in machines, programmed to act like a human in making decisions, carrying out tasks, understanding languages and many other activities that require human cognition (Gordijn & Have, 2023). AI enables systems capable of improving results and optimizing the use of time in people's daily lives (O'Connor & GPT, 2023).

One type of systems based on AI is the chatbot which responds with a text similar to human writing, when asked by the user. The chatbot, increasingly integrated into websites and messaging applications, is programmed to talk to people using natural language. This helps individuals with numerous activities and equipment, such as customer service and problem solving, personal assistants (Amazon's Alexa is one of them), organization and management of tasks and schedules, entertainment (video games) (O'Connor & GPT, 2023; Salvagno, Taccone, & Gerli, 2023).

Especially in education the use of a chatbot comes up against ethical and legal issues, as it generally does not include the sources of the answers provided, which therefore may constitute plagiarized content. Chatbot developers strive to implement protocols into the tools to ensure that information is credited (O'Connor & GPT, 2023), but this is not, at least not yet, something common in the reality of applications.

OpenAI, owner of ChatGPT, is a research institute focused on artificial intelligence, founded in 2015 by mega-entrepreneur Elon Musk, and other leaders in technology businesses (O'Connor & GPT, 2023). The developers aimed to research AI to help people around the world in the most diverse situations. Thereby, the GPT language model was developed and gradually improved, and made available to users in the format of a chatbot, called ChatGPT.

ChatGPT belongs to the class of transformative AI models, whose system is designed to understand and generate knowledge in natural language in order to assist in infinite tasks through

text responses. That is, a transformative model uses deep learning to generate texts in human language, based on the corpus of text data on which it was trained, with constant improvement via reinforcement techniques (Aydin & Karaarslan, 2022; Salvagno & Taccone; Gerli, 2023). The data that feeds ChatGPT comes from the internet, books and other sources, allowing it to answer a great number of questions, on a wide range of topics (Kirtania & Patra, 2023).

The ChatGPT platform was available for free in November/2022 (https://chat.OpenAI.com/auth/login). In January/2023, the service surpassed 100 million users worldwide (Johny, 2023). The free version of ChatGPT is 3.5. In March/2023, the GPT-4 version was released to subscribers, adding supervised learning and reinforcement techniques through InstructGPT, tasked with generating a set of answers for a specific prompt and having human annotators label the preferred answers. ChatGPT is trained on conversational prompts to encourage outputs in an adapted and creative dialogue, considering the social and cultural contexts in which the dialogue (between machine and user) occurs (Gilson, 2023).

ChatGPT is a promising tool for scientific writing and tasks such as generating drafts, summarizing articles, translating, reviewing text, suggesting a title, composing a section, describing data analysis techniques, editing content, formatting articles, dissertations and thesis, rewriting a text, locate scientific works, assist in identifying plagiarism and similarities in texts and academic works, including sending feedback to authors on the correct attribution of sources and credits (Rudolph, Tan, & Tan, 2023).

However, although the ChatGPT user can ask anything and receive a quick and appropriate written answer in a human format, this service is far from replacing the knowledge, creativity and critical thinking of a human being (Salvagno, Taccone, & Gerli, 2023). It is essential to recognize the limitations of ChatGPT and consider your responses carefully in

relation to the complexities involved. Despite the quality and relevant amount of data used in ChatGPT training, it can bring problems understanding concepts, leading to inaccurate or incomplete answers. Its dataset may contain errors and inaccuracies, which tend to be reflected in your answers, leading to inaccurate results and incorrect information (Biswass, 2023).

Even under restrictions, in April 2023, ChatGPT did not provide the sources of its answers and presented a series of limitations, recognized and explained on the company's own website, such as: generation of inappropriate content, lack of context, generic answers, generation of false information, lack of awareness or emotion and limitations in knowledge of current facts. It may be impossible soon to differentiate ChatGPT's writing from that of a human, something problematic in texts that do not cite the sources used (Bretag et al., 2018; Marche, 2022).

On this negative side, ChatGPT raises ethical concerns, requiring reflection, adjustments, controls and regulation. Such a tool, like AI and not human, lacks ethical and social responsibility in issuing responses (Salvagno, Taccone, & Gerli, 2023).

It is still too early to predict exactly how ChatGPT's AI will interfere with people's daily lives, nevertheless it is clear that the impact is likely to be strong. AI is about to be transformed and society needs to understand it, particularly when it comes to ChatGPT, understanding to take advantage of its potential contributions and prepare to deal with its potential harms.

Following, addressing explanatory variables of ChatGPT adoption, we examine TAM, as a cornerstone.

Technology Acceptance Model (TAM)

The models of intention to use and use of technology intent to explain human-psychological aspects in which innovations are accepted and disseminated in the most diverse

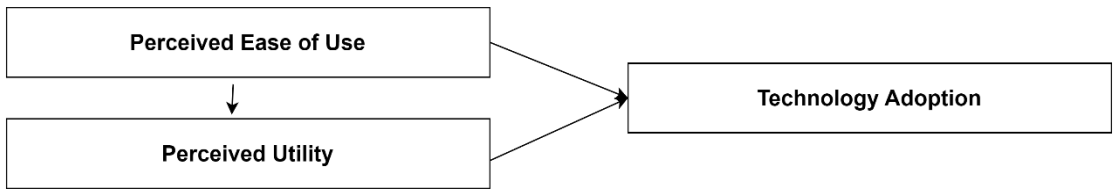
spaces of life in society (Matte, 2019). In this aspect, the TAM (Davis, 1989) is at the individual level, already validated in a wide range of research. TAM leads the way in explaining the use of technology in many fields, such as social media, healthcare, digital banking, education, e-learning materials by teachers and students, YouTube learning materials, and mobile applications (Chen & Zhao, 2022). It is one of the behavioral models most frequently used to elucidate the acceptance of technologies.

The predictors of acceptance/rejection of the use of a technology in TAM are perceived usefulness and perceived ease of use. Perceived usefulness is a person's belief that using technology may help them, more or less, in improving performance. Perceived ease of use is the belief that using technology is more or less effortless.

The TAM stipulates that an individual's perceived ease of use and perceived usefulness directly influence behavioral intention, and this, in turn, influences actual use behavior (Davis, 1989). Furthermore, the model stipulates that the perceived ease of use of a technology affects its perceived usefulness. If greater ease of use and usefulness are perceived, the behavioral intention to use the technology increases and, in the subsequent stage, its use increases (Davis, 1989). The TAM variables and relationships are presented in Figure 2.

Figure 2

TAM Model



Source: Davis (1989)

TAM appears to be relatively adequate, reliable and produces favorable results. Such advantages emerge on its own, but can be expanded when integrated with other theories (Wedari, Fatiha, & Rusmanto, 2022). Therefore, following we seek to complement the TAM, given the restrictions that apply to it.

Constraints of the TAM Model and DIT Theory

Despite the dominance of TAM in modeling technology use (Wan Sulaiman & Mustafa, 2020), it explains 45% to 75% of the variance in technology use (Mcfarland & Hamilton, 2006; Zheng & Li, 2020). Furthermore, the TAM does not explain well the use of various educational technological resources, which is often affected by variables such as government policies, financial resources and technological infrastructure (Aburub & Alnawas, 2019).

TAM also does not consider cultural, social and demographic differences, which are possibly influential factors in the use of technologies in education (Aburub & Alnawas, 2019). People from different origins, cultures, regions of a country and with different value orientations can react in different ways to technology. Each culture has its own norms, values and beliefs, which shape the way individuals perceive the world around them. Some cultures may embrace technology as a tool to improve lives, while others may be more resistant, as they value current practices and traditions more.

Moreover, at the individual level, there are specific perspectives and attitudes towards technology, influenced by variables such as personal experiences, education, age and previous exposure to technology. Some people may be naturally willing to adopt technological innovations, while others may be more skeptical or resistant to do it (Al-Maroof et al., 2020). Tarhini, Hone and Liu (2015) affirm that people from different backgrounds may be different towards acceptance of technology.

Therefore, one solution to improve results from TAM is add it with the potential of another theory. We then opted for DIT (Diffusion of Innovation Theory) (Rogers, 1995), generating an expanded and reinforced scheme. Rogers (1995) defined innovation as an idea, practice or object perceived as new by an individual. According to the author, the use of innovation involves a process of obtaining information about it, until the reasons for adopting it overcome the respective uncertainty.

DIT describes how technology and innovation are adopted in a society depending on the following five variables (Rogers, 1995). **Relative Advantage** is the level to which the individual perceives that technology offers advantages over existing alternatives. **Compatibility** is the degree to which the technology is perceived as compatible with one's values, beliefs, experience and/or needs. **Complexity** refers to the degree to which the technology is perceived as difficult to understand. The greater the Complexity, the less likely the technology will be adopted. Its opposite is the simplicity of using the technology, the ease of its instructions, or the familiarity with similar technologies. **Observability** is the level to which the technology is easily seen in the market or provides demonstrations of use. Finally, **Testability** is the ability of the technology to be tested and evaluated by the individuals before purchasing it. These DIT variables are in Table 1 and Figure 3 (Rogers, 1995).

Table 1

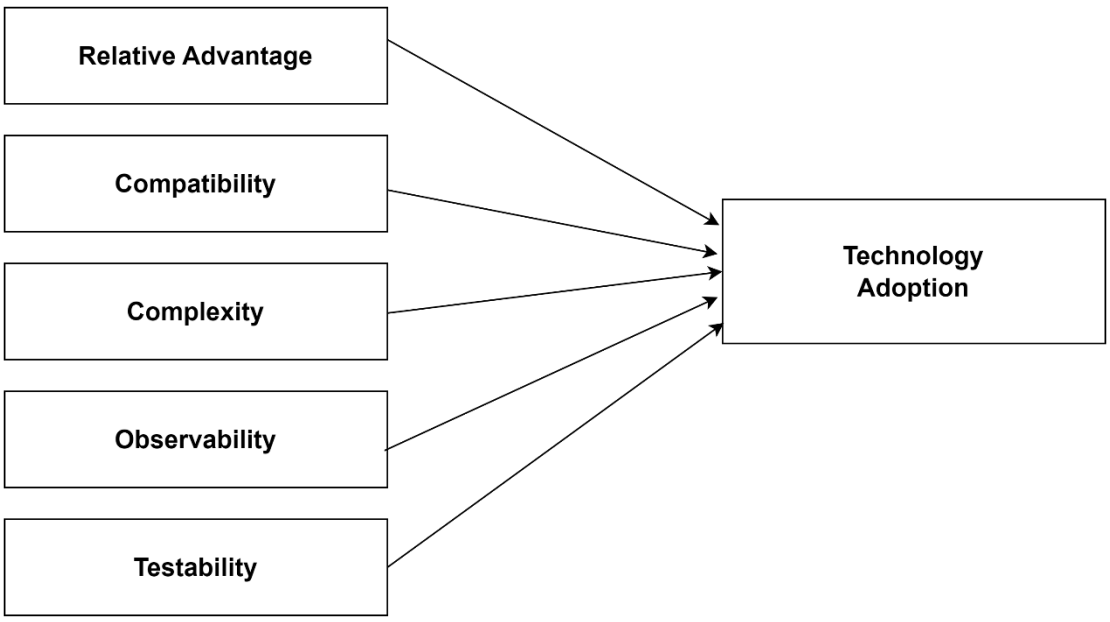
Antecedent Variables in DIT Theory

Variable	Definition
Relative Advantage	The perceived benefit of adopting the innovation.
Compatibility	The extent to which the use of innovation is based on consumer needs, values and practices.
Complexity	The difficulty of using innovative products.
Observability	The extent to which the benefits of the new product are observable to everyone.
Testability	The extent to which a new product can be tried in a limited way by consumers.

Source: Rogers (1995)

Figure 3

A schematization of the DIT Theory



Source: Rogers (1983)

Since the 1960s, DIT has been researched in various innovation contexts. The independent variables (Table 1) proved to be valid and reliable (Shim et al., 2016), making this theory effective in explaining how people would adopt an innovation.

We note that TAM's Perceived Ease of Use is the opposite of DIT's Complexity. Davis (1989, p.154) states that "complexity – defined by Rogers and Shoemaker (1971) as the 'degree to which an innovation is perceived as relatively difficult to understand and use'" – is very similar to the aforementioned Ease. Therefore, these two variables have a note (*) in Table 2.

Table 2

Background variables of the TAM Model and DIT Theory

TAM (*Similar)	DIT (*Similar)
- * Perceived Ease of Use (FUP) = minimum effort, that using a certain technology will free you from other future efforts. - Perceived Utility (PU) = level of use of a system with the intention of improving, for example, the individual's performance at work or in carrying out a task.	- * Complexity (CMP) = degree to which a new product is difficult to understand or use. - Relative Advantage (RAD) = level to which potential customers perceive a new product as superior to existing substitutes. - Compatibility (CMT) = level to which potential consumers feel that a new product is consistent with their needs, values and practices. - Observability (OBS) = ease with which a product's benefits or attributes can be observed, visualized, or described to potential customers. - Testability (TES) = level to which a new product has been tested on a limited basis by potential consumers.

Source: Research data

Theory of Cognitive Moral Development

Regarding the decision to use ChatGPT and to contemplate moral reasoning, we added the Theory of Cognitive Moral Development (TCMD) by Kohlberg (1992). The theory describes the individual's ability to make ethical decisions throughout life, divided into three levels and six stages. TCMD belongs to the set of cognitive-evolutionary theories, with the premise that human

development brings about fundamental changes in cognitive structures. These structures, when organized into a system of connections, lead to more advanced levels of balance, resulting from the interaction processes between the individual and the environment (Bataglia, Morais, & Lepre, 2010). TCMD classifies morality develops in sequential stages: with pre-conventional, conventional and post-conventional levels.

In stage 1, the individuals follow norms to avoid punishment since they conceived that rule to be respected. The rigidity of actions among individuals, as well as the mere exchange of actions between the self and others, correspond respectively to equality and reciprocity (Kohlberg, 1992).

In stage 2, standards are met out of necessity. Individuals have different needs and interests. However, they are equal in society, despite not conquering the ability to adopt others' perspectives (Kohlberg, 1992).

In stage 3, adherence to norms is motivated for the sake of social interactions. Equality is linked to equitable treatment among individuals in the adequate performance of their roles in society. Social exchanges involve values such as trust, loyalty and gratitude. At this point, the individual begins to adopt the other's perspective, understanding their thoughts and feelings. The saying "don't do to others what you don't want them to do to you" gains strong relevance at this stage (Kohlberg, 1992).

In stage 4, norms have the role of preserving order and harmony in society. All individuals are considered equal, consequently, everyone has a responsibility to comply with social norms. Reciprocity concerns the interaction between the individual and society, so people ensure that their rights are also respected by complying with laws (Kohlberg, 1992).

In stage 5, norms transcend the function of maintaining social well-being and become crucial for ensuring individual rights. Those norms are stipulated through agreements between each individual and society, and the fundamental principle is equality of rights among people (Kohlberg, 1992).

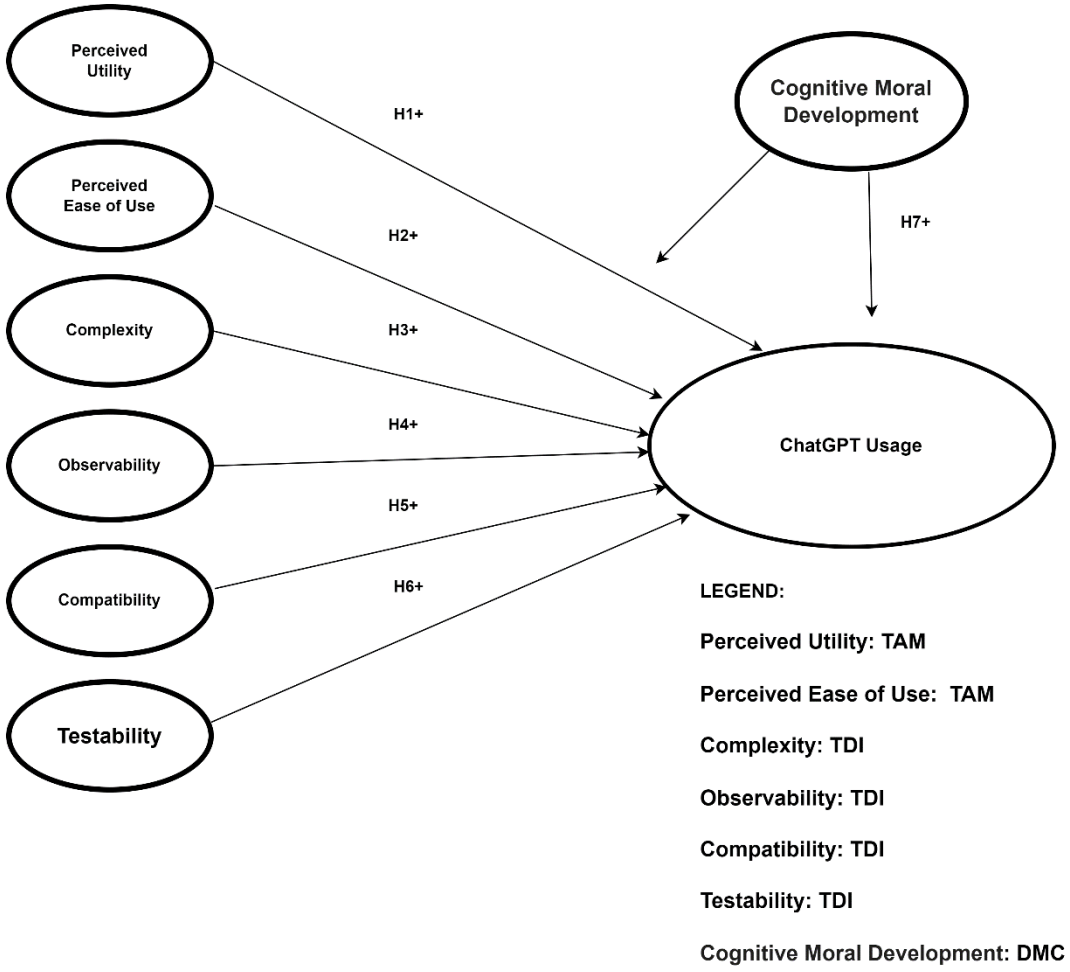
In stage 6, norms hold a secondary role compared to ethical principles, which guide individual actions. The rules are followed since they are based on the principles that protect fundamental human rights, such as life, freedom and dignity. Equality arises from considering everyone as human beings, deserving of a worthy existence, with inalienable rights to be protected and respected. Ideally, there will be an interaction based on values and respect for the lives of others emerges, as well as fair and dignified treatment among people and between society and each individual (Kohlberg, 1992).

Proposed Integrative Model

Although the PIM is based on three solid theoretical concepts, its application lacks empirical support, especially due to the specificities of ChatGPT and the scenario of people in Brazil.

Figure 4

The Proposed Integrative Model and its propositions



Source: Davis (1989) *apud* Lopes, Caracciolo and Herrero (2018), Guangxiang and Chaojun (2023), Chocarro, Cortiñas and Marcos-Mata (2021), Malik et al. (2021), Davis (1989) *apud* Lopes, Caracciolo and Herrero (2018), Chocarro, Cortiñas and Marcos-Mata (2021), Bilquise, Ibrahim and Salhieh (2023), Malik et al. (2021), Kumar and Silva (2020), Rogers (1995) *apud* Shim, (2016)

Method and Empirical Procedures

The method was qualitative, with in-depth exploration through a pilot project with semi-structured interviews. The focus was on experts who use ChatGPT in their respective areas of

specialization, including two journalists, two technology professionals and two teachers. The interview guide is in table 3, with the respective references.

Table 3

In-depth interview script

Construct	Question	Main authors
Compatibility	Have you ever used or use technology similar to ChatGPT? (If so, what was the technology and what was the experience like).	Rogers (1995)
Perceived usefulness	Do you use or have you used ChatGPT?	Davis (1989) *apud* Lopes, Caracciolo & Herrero (2018) Guangxiang & Chaojun (2023) Chocarro, Cortiñas & Marcos-Mata (2021) Malik et al. (2021) Kumar e Silva (2020)
Complexity	Do you find using ChatGPT easier to use than similar technologies?	Davis (1989) *apud* Lopes, Caracciolo & Herrero (2018) Chocarro, Cortiñas & Marcos-Mata (2021) Bilquise, Ibrahim & Salhieh (2023) Malik et al. (2021) Kumar e Silva (2020) Rogers (1995)
	Did you encounter difficulties on the OpenAI website, which gives access to ChatGPT on your first access?	
	Do you use ChatGPT because you have seen advantages over other tools?	
Compatibility Conventional level – Stage 4	Is your purpose for using ChatGPT professional, personal or both?	Davis (1989) *apud* Lopes, Caracciolo & Herrero (2018) Guangxiang & Chaojun (2023) Chocarro, Cortiñas & Marcos-Mata (2021) Malik et al. (2021) Kumar e Silva (2020) Rogers (1995)
	What are your expectations regarding the benefits that ChatGPT can offer?	
Compatibility	Did you have difficulties using ChatGPT? (If yes, tell me about them)	Davis (1989) *apud* Lopes, Caracciolo & Herrero (2018) Chocarro, Cortiñas & Marcos-Mata (2021) Bilquise, Ibrahim & Salhieh (2023) Malik et al. (2021) Kumar e Silva (2020) Rogers (1995)
Conventional level – Stage 4 Compatibility Testability	Are you satisfied with ChatGPT? Does it meet your expectations?	Rogers (1995)
	In addition to what you mentioned, are there other positive points about ChatGPT?	
	What about the negative points of ChatGPT? Would you like to add something?	
TCMD, Preconventional Level	And looking from the other side, what do you see as morally correct in using ChatGPT?	Rogers (1995) Kohlberg (1992)
Stages 1 and 2	Do you see anything morally wrong with using ChatGPT?	
TCMD, Post-conventional level,	What could be improved so that you use ChatGPT more frequently?	Rogers (1995)
Stage 5	Did you subscribe to the Premium version after using the free version of ChatGPT? (If not, why?)	
TCMD, Conventional level,		Kohlberg (1992)
Stage 3	Did you start using ChatGPT out of obligation or out of your own free will?	

Construct	Question	Main authors
Relative advantage	How do you see the issue of using ChatGPT to circumvent rules, such as university work?	Kohlberg (1992) Davis (1989)
Observability	Did you use ChatGPT because a lot of people used it?	Kohlberg (1992)

Source: Research data

We used Bardin's Content Analysis to examine the qualitative data. This kind of analysis, well recognized in the Humanities and Social Sciences, consists of a set of techniques for analyzing interviews via systematic and objective procedures, aimed at describing the content of the texts (Bardin, 2006).

We analyzed interview content with AtlasTi software, tailored for qualitative data from any source (such as surveys, interviews, articles, email, social media and web content, Word, PDF, spreadsheets and notes). AtlasTi deeply analyzes both small and large volumes of data. (AtlasTi, 2024).

The results are presented in the next section, and the full textual data is in Appendix 1.

Results

We identified 16 new variables potentially influential in the use of ChatGPT. These variables are following listed with excerpts from the interviews.

Accessibility (AC): ease and opportunity identified in people with different capabilities which them can access products, services and information.

> **Interviewee 3:** *Well, I see that today when you have an artificial intelligence tool like this in your hand, you end up expanding a little more information that you wouldn't otherwise have. So, I'll give you an everyday example, a leaflet for a medicine. Today you can get a summary of a medicine leaflet on ChatGPT and instead of taking that medicine and reading the entire leaflet, many people have difficulty reading a leaflet with all that detail. You put ChatGPT there, you tell ChatGPT, it transcribes it and tells you about the leaflet. So, there are many facilities that ChatGPT will bring to humanity in a short period of time.*

Connectivity Access (CON): availability of a reliable internet connection or other networks is essential for the use of ChatGPT.

> **Interviewee 2**: *I believe that people, which is a great possibility for people, as they are very connected with their cell phones, ChatGPT, I don't even know if there is a ChatGPT app, is there already a ChatGPT app? […] So, as soon as this evolves and becomes more available on cell phones, I think people will, just as they asked Google*

questions about a certain subject, they may start asking questions to ChatGPT, on any subject, any doubt that arises.

Technology Trust: (TT): users have trust in ChatGPT's ability to provide accurate and reliable responses. Trust is key, especially when users rely on ChatGPT for critical information or making relevant decisions. The more users trust the technology, the more likely they are to use it regularly.

Interviewee 2: *So, from the negative points is the following. For example, I gave a certain command, which is already well known in academia, that ChatGP invents bibliographic references. So, I gave him a command to indicate authors and with the appropriate bibliographic references. He does, but they are all fake.*

Creativity (CR): ability to create original ideas, solutions or products, beyond common standards.

Interviewee 7: *Back at consumption. But because I'm an educator, I work with an idea in line with thinking about technology as art, as a creative device, right? And then, within my thesis, I bring a very similar idea to Heidegger, right? When he talks about technique in the text, right? He says that technique is not essentially technique, right? What does he mean by that? That, at some point, we stopped thinking of technology as a human production. And then comes this crazy idea that I have to consume technology to do something or I have to solve a problem with technology. When, in fact, we can use technology simply to express ourselves, to have fun, right?*

Entertainment (ENT): activities and ways of entertainment that aim to entertain and please people, offering leisure and escapism from everyday life, providing opportunities for relaxation.

Interviewee 7: *I often used ChatGPT because I really wanted to play, get to know what it is. And I think this issue of entertainment, right? Just leisure, right? Mental health disconnected from consumption is very interesting for us to explore in artificial*

technologies, right? Working on the issue of senses, working on the issue of social inclusion, right?

Expectations (EXT): expectations created by users regarding the performance and functionalities of ChatGPT may influence the use. If expectations are met or exceeded, it becomes more widely used.

Interviewee 5: *For example, what will it be like when quantum computing is a reality, for a wider audience? It already exists, the equipment is very expensive, there is little equipment in the world that works with this technology, but we can, perhaps, do an exercise in futurology, thinking about what this combination of everything we are already applying in artificial intelligence will be like, tools like ChatGPT, and when this is widely used alongside quantum computing*

Previous Experience (PEX): previous experience with similar technologies. Previous experience may influence use.

Interviewee 1: *Google doesn't have a very good translation tool. So, you can do the opposite too. You found a text in Portuguese, you have a text there in Portuguese, you want to convert it to English. You can pick up and play this, it will bring a good translation.*

Feedback and Continuous Improvement (FCI): feedback and continuous improvement system in place for ChatGPT. Knowing that the system is constantly evolving may increase usage.

Interviewee 7: *Because when he makes a mistake, he doesn't give me a self-correction alternative, right? It waits for your input. So this for multiple operations. For several operations it is problematic because it takes away the fluidity of natural language, right? There's that break in natural language. It has improved in some ways, right? But another limitation it has is that it doesn't link to chats, right? So, for example, I open a chat, a tab, right? And I'm talking about video games, right? Then in the other tab I talk about learning through games. And in the third tab I talk about serious games. Everything I asked about the three things are within each chat. But I can't do a fourth chat saying, oh, correlate*

chat 1 with chat 2. It doesn't allow me to do that, right? I have to do a new search within this chat. This also limits it a bit, right?

Perceived innovation (INP): perception of ChatGPT as an innovation. The more users perceive ChatGPT is innovative, the more likely they are going to use it.

Interviewee 3: *In fact, it already has a constantly improving feature, ChatGPT. We have to be patient and wait, right? More and more you realize that it has been evolving. As long as more people use it, it will evolve. Because he is an artificial intelligence and he learns from what we tell him. So, there's not much to escape from that. There's not much to come and say like that, this point needs to be improved. No, it's us using ourselves that will improve. His algorithm was created like this. The more I use it, the stronger and smarter it becomes. So, that's the whole point of artificial intelligence.*

Integration with Existing Systems (IES): Whether ChatGPT easily integrates with existing technology or other tools that users use could be an important factor in usage.

Interviewee 2: *So, you want to put together a PowerPoint to put together a lesson. It is an activity that demands a lot of the teacher's time. Assemble PowerPoint, ability to summarize information. Select the correct images that will refer to the specific case, what you are bringing. And teachers often don't have as many editing skills. To put together that beautiful presentation. So, artificial intelligence, ChatGPT doesn't put this together yet. It looks like they were integrating the Office suite to open up this possibility.*

Time saving (TS): practice of efficient use is related to time to achieve tasks and goals productively. This involves prioritizing and eliminating unnecessary activities.

Interviewee 2: *Wow, I don't think I see it because I think I was able to express how much I use it and I think that, how happy I am with ChatGPT, today I can actually take advantage of my time a little more to make another type of course, because it is very tedious for the teacher to always have to come up with the class, and so, the class you come up with for one class is not the same one you will apply in class B, so you have your variances there also, and I spent a lot of time preparing classes and I didn't have time to do personal training, so today I managed to optimize my time for class preparation, for preparing activities, for research, and today I have more time for my personal training.*

Customization (CUST): it is related to possibilities to tailor interactions with ChatGPT to meet individual needs, which may influence user satisfaction and usage.

> **Interviewee 4:** *It has become increasingly customized. So, for example, you can take ChatGPT nowadays and you have a tool there that allows you to customize the type of response you want it to give. So I think this is an implementation that they have done, which is interesting. And then, I think it's also important to remember that the ChatGPT we're talking about is that public and such, which is free, but it has a paid ChatGPT, which has many other features that could be useful, which I haven't tested, which I I don't use it, but they have also increased and made several updates to this paid one.*

Workload Reduction (WR): reducing workload, which can be a strategy to balance professional and personal life, improve efficiency and reduce stress.

> **Interviewee 6:** *I believe that ChatGPT came with the purpose of optimizing our time. So basically today it can be worked as an ally to teachers. So today I can literally program, prepare a class, much faster than I did before, you know?*

Perceived Risk (PR): it refers to users' concerns on potential negative consequences of using ChatGPT, such as inaccuracies in responses and false information.

> **Interviewee 5:** *It could represent an important tool, for example, for invading privacy, even for destroying people's reputations. Imagine the application, right, making a cross between artificial intelligence and fakenews, right? Imagine what it would be like, how devastating it would be, right, for people's reputations and even for generating crises, right, because many crises arise from fake news.*

Satisfaction (SAT): the more satisfied users are with their experience, the more likely they are to use the technology.

> **Interviewee 6:** *I think I've already listed it here, I think everyone here that I could, so, I think it's a spectacular tool, right. So, it's not just focused on a single area, right? So, I think that any professional can extract 100% within their area. So, I don't know, I think it's a spectacular tool.*

Security (SEG): The perception of security related to handling of confidential information and privacy of interactions with ChatGPT technology.

> **Interviewee 7:** *In the first update, I confess that I felt a little difficult, but because of insecurity, because I'm annoying with this LGPD issue, right? The use of data, right? I'm one of those annoying people who read articles by item, so much so that I created a new Gmail account to be able to register, to make this process a little easier.*

In theory, all 16 variables described improve the understanding of the adoption of ChatGPT technology. However, to improve the PIM, we chose to include two variables, **Trust in Technology (TT)** and **Time Saving (TS).** This is because they are the most relevant items to explain the use of ChatGPT, according to the results of the analysis of the interviews, as well as the metatheoretical criterion of parsimony. The addition of two variables resulted in new propositions for the PIM, elaborated as follow.

New Proposals and Restructuring of PIM

Before the development of the qualitative step, our PIM had the following seven propositions.

H1. Perceived Usefulness of ChatGPT positively influences the use.

H2. Perceived Ease of Use in ChaGPT positively influences intention to use.

H3. The Complexity of ChatGPT positively influences the use.

H4. Observability during the use of ChatGPT positively influences the usage.

H5. ChatGPT Compatibility positively influences the use.

H6. ChatGPT Testability positively influences the use.

H7. TCMD moderates the relationship between Perceived Usefulness and ChatGPT Usage.

The restructured PIM enclosed the new variables Trust in Technology (TT) and Time Saving (TS), in addition to the existing variables, and nine propositions to be tested. These propositions were subjected to empirical tests to verify their validity and contribution to understanding the use of ChatGPT in the Brazilian context. Therefore, in the next section, we present the method used to survey the new variables.

It is common to find asymmetry in interactions between companies and consumers, as companies generally hold more economic power. Despite this disparity is inevitable, companies have the ability to soften it. Otherwise, it would be difficult to establish a lasting relationship. One of the main ways to mitigate this asymmetry in service exchanges is to gain consumer trust (Sirdeshmukh, Singh, & Sabol, 2002).

The importance of trust in relationships between customers and companies varies depending on the situation. In some situations, trust is essential when the quality of the service is uncertain, the consequences are significant and the customer plays an active role (Sirdeshmukh, Singh, & Sabol, 2002).

Sirdeshmukh, Singh and Sabol (2002) analyzed how trust and loyalty are linked in purchases process. The authors found that when a company achieves a customers' trust, that customers feel more secure and loyal to the company. To maintain the trust level, customers tend to act loyally towards the company. Additionally, they noted that trust also makes customers feel closer to the company, which leads to stronger commitment and a reciprocal relationship. Thus, we established the following proposition.

H8. The Reliability of the Information Provided by ChatGPT positively influences the use.

The second additional proposition addresses the Time Saving variable. In society, time is often considered a valuable resource, meant to be used productively. Similar to other resources, time can be traded, spent, saved or wasted, and its management can be effective or ineffective. When individuals manage the time efficiently, establishing priorities, planning their schedule and organizing their lives, they develop a sense of control over time allocation, which generates a feeling of mastery. This control over time results in less stress, greater efficiency and satisfaction (Leite et al., 2003; Tanure, Carvalho Neto, Santos, & Patrus, 2014; Sarriera, Tatim, Coelho, & Bücker, 2007; Barbosa, 2019; Neubert, Mont Alvão, & Tavares Júnior, 2016).

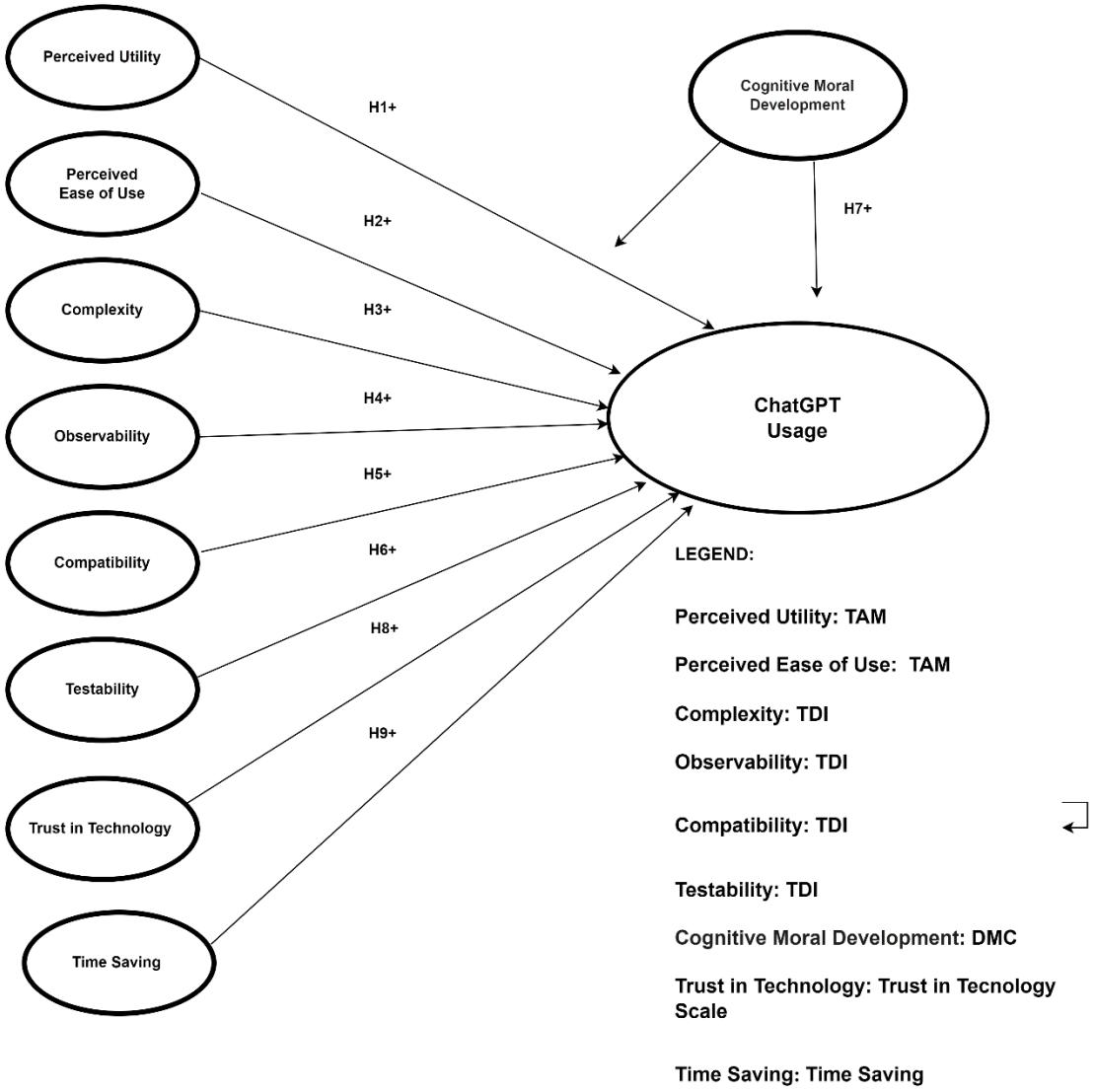
The way a person perceives the time usage, including its structure and usefulness, is a psychological concept of great relevance (Feather & Bond, 1983). Both the structure and organization of time are linked to high levels of satisfaction, in the work environment and in life in general (George, 1991). Here is the reasoning for proposition 9.

H9. Time Saving positively influences the Use of ChatGPT.

The restructured PIM is showed in Figure 5.

Figure 5

Restructuring of the Proposed Integrative Model and its propositions



Source: Davis (1989) *apud* Lopes, Caracciolo and Herrero (2018), Guangxiang and Chaojun (2023), Chocarro, Cortiñas and Marcos-Mata (2021), Malik et al. (2021), Kumar and Silva (2020), Davis (1989) *apud* Lopes, Caracciolo and Herrero (2018), Chocarro, Cortiñas and Marcos-Mata (2021), Bilquise, Ibrahim and Salhieh (2023), Malik et al. (2021), Rogers (1995) *apud* Shim, (2016), Sirdeshmukh, Singh and Sabol (2002), Leite et al. (2003), (George, 1991), Feather and Bond (1983), Sultan and Uddin (2011).

Regarding morality, the interviews revealed (Appendix 2) three relevant aspects. First, morality may be intrinsically related to the inherent characteristics of ChatGPT, which therefore places responsibility on the company OpenAI. This fact encompasses concerns about moral issues that may negatively impact races, cultures and societies, as well as the use of content from authors without authorization.

> **Interviewee 6:** *So, for example, stereotypes or prejudiced biases, consolidated images that we have in our imagination, which do not necessarily reproduce the diversity of society. So, I think these are problems that are there.*

> **Interviewee 4:** *You copy and paste a text from ChatGPT that is not yours and say that it is yours, it has several problems, in addition to a moral problem, there is a problem that is ChatGPT was trained with various public information and there is this issue and this problem of the fact that OpenAI did not pay and did not request copyright from these authors who had their texts used to train ChatGPT. So, if you create a text with ChatGPT and use this text as your own, you are not only using a ChatGPT text, but also a text from people who had their information used there by ChatGPT for it to be created. So, I think there are two layers of problems there.*

Furthermore, in this research the interviewees highlighted that morality is an intimate element, independent of the technology in question. Each individual, in a given situation, exercises his or her own morality, which extends beyond ChatGPT, encompassing decision-making regarding the use of any technology. Historically, digital tools and resources have always been available, keeping the fundamental principle of their use.

> **Interviewee 6:** *The tool, we cannot attribute to the tool something that is based on us humans, with our consciousness. So, I believe it depends, not on the tool, but on the user. The tool should have, as I mentioned, some locks there. Now, it is up to each person to use the tool correctly. For example, something very simple, I don't know if that would somehow explain what I want to say in a better way. A person can buy a knife and use it as a cooking instrument. At the same time, she can take this knife and use it to eliminate the life of a human being or an animal. ChatGPT is a tool. It can very well be used within moral and ethical precepts. It could also be, in some way, that something stops and causes harm to both the person, the user and third parties. So, I see it this way. I don't know if that was the idea of the question, right? But that's how I understood the question and how I position myself on it.*

On the other hand, the practice of reproducing content, regardless of the technological era, has always been considered an illegal activity and subject to punishment, which reinforces the idea that reproducing ChatGPT content does not represent something new from a legal point of view.

> **Interviewee 4:** *the use, it is a tool, a tool that can be useful and I think that, therefore, the limits of this use are the limits that already existed for other tools. So, nothing that infringes copyright, intellectual rights, that doesn't interfere, that doesn't interfere, that you don't delegate to him tasks that you should do, you know? I think this is a barrier, for us to divide what is moral use or not, but morality, after all, is very personal too, right?*

Final Considerations

In this article we aimed to identify new variables through interviews with experts who use ChatGPT in their respective areas of specialization, with the purpose of improving the ChatGPT adoption PIM. PIM, in turn, is based on three consolidated theories: TAM, DIT and TCMD.

In addition to the variables identified, this study provided significant contributions regarding morality, which constitutes the core construct of this research.

Regarding academic contributions, it is possible to point out that there is a need to test new relationships in future studies. Due to the temporal restrictions of this research, only two variables were included in the Proposed Integrative Adoption Model (PIM): Trust in Technology (TT) and Time Saving (TS). The remaining variables are suggested for further investigation, aiming to provide a more solid basis for future analyses.

In order to induce or refer to the use of ChatGPT, managers and educators can implement a series of strategies considering the different variables revealed in this research.

When accessing connectivity, managers can ensure that the company has a reliable network infrastructure, ensuring stable internet access. Likewise, educators must ensure that their students have access to quality internet to use ChatGPT as an educational tool.

Confidence in the technology can be promoted by managers through training and demonstrations that indicates the accuracy and reliability of ChatGPT. Educators, in turn, can provide clear guidance on how ChatGPT can be reliably used as an educational resource.

Managers can encourage an organizational culture that values creativity, encouraging employees to explore new ways to use ChatGPT to solve business problems. Also, educators can integrate ChatGPT into learning activities that stimulate students' creativity.

Establishing realistic expectations about ChatGPT's performance and features is important for managers, who must clearly communicate its purposes and limitations. Likewise, educators should help students understand expectations regarding using ChatGPT as an educational tool.

Prior experience can be enhanced by managers by providing opportunities for employees to explore and try out ChatGPT before full implementation. Meanwhile, educators can provide practical activities that allow students to develop familiarity with ChatGPT and other similar technologies.

Aiming to promote feedback and continuous improvement, managers can implement a feedback system for employees to share their experiences with ChatGPT and suggest improvements. Likewise, educators can solicit feedback from students about their experience with ChatGPT and use this information to adapt their teaching practices.

Offering personalized training is a strategy that managers also can adopt to allow employees to learn how to customize their interactions with ChatGPT, according to individual needs. Meanwhile, educators can explore ChatGPT's customization options to tailor teaching materials to students' preferences and learning styles.

Finally, managers must implement appropriate security measures to protect employees' confidential information and privacy when using ChatGPT. Moreover, educators should educate students on security best practices when using ChatGPT and other digital technologies.

In short, considering all these variables, managers and educators can improve the effective use of ChatGPT, implementing appropriate strategies to promote its use both in the company and in the classroom.

Therefore, we conclude this study taking into consideration all the additions and suggestions highlighted in this article for improving the PIM. This process comprises a significant transition, incorporating the insights and improvements identified during this qualitative review, thereby ensuring a more complete and refined approach to the use of this questionnaire in subsequent studies.

AUTHORS'CONTRIBUTIONS

Contribution	Urdan, A. T.	Marson, C.
Contextualization	X	X
Methodology	X	X
Software	X	X
Validation	X	X
Formal analysis	X	X
Investigation	X	X
Resources	X	X
Data curation	X	X
Original	X	X
Revision and editing	X	X
Viewing	X	X
Supervision	X	
Project management	X	
Obtaining funding	-	-

References

Aburub, F.& Alnawas, I. (2019). A new integrated model to explore factors that influence

adoption of mobile learning in higher education: An empirical investigation. *Education and Information Technologies,* 24, 2145-2158. Disponível em: https://doi.org/10.1007/s10639-019-09862-x

Al-Maroof, R. S., Salloum, S. A., Alhamadand, A. Q. & Shaalan, K. (2020). Understanding an extension technology acceptance model of google translation: a multi-cultural study in United Arab Emirates. *International Journal of Interactive Mobile Technologies (IJIM)*, *14*(03), 157-178. Disponível em: https://doi.org/10.3991/ijim.v14i03.11110

Almeida, F., Aguiar, Y., & Magalhaes, R. (2023). Você sabe diferenciar um resumo escrito por humanos do gerado pelo ChatGPT?. In *Anais do XIV Workshop sobre Aspectos da Interação Humano-Computador para a Web Social*, (pp. 72-78). Porto Alegre: SBC. Disponível em: doi:10.5753/waihcws.2023.233777

AtlasTi. *Manuals and Documents.* Berlim: ATLAS.ti Scientific Software Development, 2024. Disponível em: https://atlasti.com/es/acerca-de-atlas-ti

Arévalo, J. A. & Quinde, M. (2023). ChatGPT: La creación automática de contenidos con Inteligencia Artificial y su impacto en la comunicación académica y educativa. *Revista Desiderata* (22). Disponível em: https://produccioncientifica.usal.es/documentos/65baa1e15ffdcd6d665b14a8

Aydın, O. & Karaarslan, E. (2022). *OpenAI ChatGPT* generated literature review: digital twin in healthcare. *Emerging Computer Technologies,* 2. 22-31. Disponível em: http://dx.doi.org/10.2139/ssrn.4308687

Bataglia, P., Morais, A. & Lepre, R. M. (2010). A teoria de Kohlberg sobre o desenvolvimento do raciocínio moral e os instrumentos de avaliação de juízo e competência moral em uso no Brasil. *Estudos de Psicologia*, 15(1), 25-32. Disponível em: :

https://doi.org/10.1590/S1413-294X2010000100004

Barbosa, A. L. N. de H. (2019). Tendências na alocação do tempo no Brasil: trabalho e lazer. *Revista Brasileira de Estudos de População*, 35(1), 1-28. Disponível em: https://doi.org/10.20947/s102-3098a0063

Bardin, L. (2006). *Análise de conteúdo*. Lisboa: Edições 70.

Bilquise, G., Ibrahim, S. & Salhieh, S. E. M. (2023). Investigating student acceptance of an academic advising chatbot in higher education institutions. Education and Information Technologies. Disponível em: https://doi.org/10.1007/s10639-023-12076-x

Biswas, S.S. (2023). Potential Use of Chat GPT in Global Warming. *Annals of Biomedical Engineering* 51, 1126–1127. Disponível em: https://doi-org.ez345.periodicos.capes.gov.br/10.1007/s10439-023-03171-8

Bretag, T., Harper, R., Burton, M., Ellis, C., Newton, P., Rozenberg, P. Saddiqui, S. & Haeringen, K. V. (2019). Contract cheating: a survey of Australian university students. *Studies in Higher Education*, 44(11), 1837-1856. Disponível em: https://doi.org/10.1080/03075079.2018.1462788

Cargnelutti, R., Bernardino, M., Garcia, R., & Silva, W. (2023). Um Estudo Exploratório sobre o uso do ChatGPT na Melhoria e Revisão da Escrita de Artigos Científicos. In *Anais do XXXIV Simpósio Brasileiro de Informática na Educação*, (pp. 1271-1281). Porto Alegre: SBC. Disponível em: doi:10.5753/sbie.2023.234610

Chocarro, R., Cortiñas, M. & Marcos-Matás, G. (2021). Teachers' attitudes towards chatbots in education: a technology acceptance model approach considering the effect of social language, bot proactiveness, and users' characteristics, *Educational Studies.* Disponível: https://doi.org/10.1080/03055698.2020.1850426

Chen, Y. & Zhao, S. (2022). Understanding chinese efl learners' acceptance of gamified vocabulary learning apps: an integration of *self*-determination theory and technology acceptance model. *Sustainability*, *14*(18), 11288. Dispoível em: https://doi.org/10.3390/su141811288

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly***,** 13(3). Disponível em: https://doi.org/10.2307/249008.

Eloundou, T., Manning, S., Mishkin, P. & Rock, D. (2023). GPTs are GPTs: An Early Look at the Labor Market Impact Potential of Large Language Models. *General Economics.* Disponível em: https://doi.org/10.48550/arXiv.2303.10130

Feather, N. T. & Bond M. J. (1983). Time structure and purposeful activity among employed and unemployed university graduates. Journal of Occupational Psychology, 56, 241-254.Disponível em: https://doi.org/10.1111/j.2044-8325.1983.tb00131.x

George, J. (1991). Time structure and purpose as a mediator of work-life linkages. Journal of Applied Social Psychology, 21, 296-314. Disponível em: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1559-1816.1991.tb00522.x

Gordijn, B., & Have, H. (2023). ChatGPT: Evolution or revolution? *Medicine, Health Care, and Philosophy*, 26(1), 1-2. Disponível em: https://doi.org/10.1007/s11019-023-10136-0

Gilson, A., Safranek, C. W., Huang, T., Socrates, V., Chi, L., Taylor, R. A. & Chartash, D. (2023). How does chatgpt perform on the united states medical licensing examination? the implications of large language models for medical education and knowledge assessment. *JMIR Medical Education*, 9. Disponível em: doi 10.2196/45312

Guimarães, Renato Ribeiro; Malacarne, Vilmar; Alves, Fábio Lopes. (2024). ChatGPT,

Metaverso, Web3 e outras tecnologias: desafios à educação do futuro. *Debates em Educação*, (16)38, p. e16114. Disponível em: https://doi.org/10.28998/2175-6600.2024v16n38pe16114

Johny, R. M. (2023). *ChatGPT sets record for fastest-growing app with 100 million users. Report*. Indía: Hindustan Times. Disponível em: https://www.hindustantimes.com/technology/chatgpt-sets-record-for-fastest-growingapp-with-100-million-users-report-101675323297627.html

Kirtania, D. K. & Patra, S. K. (2023). *OpenAI* chatGPT generated content and similarity index: a study of selected terms from the library; information science (LIS). *Qeios*, 2. Disponível em: https://doi.org/10.32388/FO1CP6.2

Kohlberg, L. (1992). *Psicología del desarrollo moral*. Espana: Desclée De Brouwer.

Kublick, S. & Saboo, S. (2023). *GPT3: the ultimate guide to building NLP products with OpenAI API*. Estados Unidos: Art Painter. Ebook. Disponível em: https://learning.oreilly.com/library/view/gpt-3/9781805125228/xhtml/xhtml-0-1.xhtml

Kumar, J. A. & Silva, P. A. (2020). Work-in-Progress: A Preliminary Study on Students' Acceptance of Chatbots for Studio-Based Learning. *IEEE Global Engineering Education Conference (EDUCON)*, 27-30 abril. Porto Portugal. Disponível em: https://doi.org/10.1109/EDUCON45650.2020.9125183

Leite, Umbelina do Rego, Tamayo, Álvaro, & Günther, Hartmut. (2003). Organização do uso do tempo e valores de universitários. Avaliação Psicológica, 2(1), 57-66. Recuperado em 08 de novembro de 2023, de http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1677-04712003000100007&lng=pt&tlng=pt

Lopes, E. L., Caracciolo, L. L. & Herrero, E. (2018). Aceitação do mobile banking no Brasil:

uma análise por meio do modelo TAM estendido. *Teoria e Prática em Administração*, 8(1). Disponível em: https://doi.org/10.21714/2238-104X2018v8i1-37816

Malik, R., Sharma, A., Trivedi, S. & Mishra, R. (2021). Adoption of Chatbots for Learning among University Students: Role of Perceived Convenience and Enhanced Performance. International Journal of Emerging Technologies in Learning (iJET). 16(18):200. Disponível em: https://doi.org/10.3991/ijet.v16i18.24315

McFarland, D. J. & Hamilton, D. (2006). Adding contextual specificity to the technology acceptance model. *Computers in Human Behavior*, *22*(3), 427–447. Disponível em: https://doi.org/10.1016/j.chb.2004.09.009

Marche, S. (2022). The college essay is dead: nobody is prepared for how AI will transform academia. *The Atlantic*. Disponível em: https://www.theatlantic.com/technology/archive/2022/12/chatgpt-ai-writing-collegestudentessays/672371/

Matte, J., Welchen, V., Costa, L. F., Fachinelli, A. C. Miri, D. H., Chais, C. & Olea, P. M. (2021). Evolução e tendências das teorias de adoção e aceitação de novas tecnologias. *Revista Tecnologia e Sociedade*, Curitiba, 17(49), 102-117. Disponível em: https://doi.org/10.3895/rts.v17n49.13364

Neubert, L. F., Mont Alvão, A., & Tavares Júnior, F. (2016). Social stratification and time use: studying individuals in the labor market. *Civitas*, 16(2), 110-125. Disponível em: https://doi.org/10.15448/1984-7289.2016.2.24105

O'Connor, S. & GPT. (2023). Open artificial intelligence platforms in nursing education: tools for academic progress or abuse? *Nurse Education in Practice*, 66. Disponível em: https://doi.org/10.1016/j.nepr.2022.103537

Olivos, P. (2023). Diálogo con ChatGPT sobre la sagacidad psicológica. *Psiquiatría Y Salud Mental (40)*1/2, p. 16 – 29. Disponível em: https://www.researchgate.net/publication/378770077_Dialogo_con_ChatGPT_sobre_la_sagacidad_psicologica

OpenAI (2022). *ChatGPT: Optimizing Language Models for Dialogue*. Disponível em: https://OpenAI.com/blog/chatgpt/

OpenAI (2023). *ChatGPT: Optimizing Language Models for Dialogue*. Disponível em: https://OpenAI.com/blog/chatgpt/

Rocha, N. (2023). Oportunidades e Riscos do ChatGPT: um aliado ou inimigo ?. *The Trends Hub*, (3). Disponível em: https://doi.org/10.34630/tth.vi3.5039

Rogers, E.M. (1983) *Diffusion of innovations*. New York: The Free Press.

Rogers, E. M. (1995). *Diffusion of innovations*. New York: 12.

Rogers, E. M. & Shoemaker, F. F. (1971). *Communication of Innovations: a cross-cultural approach.* New York, NY: Free Press.

Rudolph, J., Tan, S. & Tan, S. (2023). ChatGPT: bullshit spewer or the end of traditional assessments in higher education?. *Journal of Applied Learning and Teaching*, 6(1). Disponível em: https://doi.org/10.37074/jalt.2023.6.1.9

Salvagno, M., Taccone, F. S. & Gerli, A. G. (2023). Can artificial intelligence help for scientifc writing?. *Critical Care*, 27(75). Disponível em: https://doi.org/10.1186/s13054-023-04380-2

Santos, A. M., & Neves, J. E. D. A. (2023). Exploração maliciosa do ChatGPT para ataques cibernéticos. *FatecSeg - Congresso De Segurança Da Informação*. Disponível em: https://www.fatecourinhos.edu.br/fatecseg/index.php/fatecseg/article/view/108

Sarriera, J. C., Tatim, D. C., Coelho, R. P. S., & Bücker, J. (2007). Uso do tempo livre por adolescentes de classe popular. *Psicologia, Reflexão e Crítica*, 20(3), 361-367. Disponível em: https://doi.org/10.1590/S0102-79722007000300003

Shim, D., Kim, J. G. & Altmann, J. (2016). Identifying key drivers and bottlenecks in the adoption of E-book readers in Korea. *Telematics and Informatics*, *33*(3), 860–871. Disponível em: https://doi.org/10.1016/j.tele.2015.12.009

Sirdeshmukh, D., Singh, J., & Sabol, B. (2002). Consumer Trust, Value, and Loyalty in Relational Exchanges. Journal of Marketing, 66(1), 15-37. Disponível em: https://doi.org/10.1509/jmkg.66.1.15.18449

Sultan, M. U. & Udin, N. (2011). Consumer's attitude towards online shopping: factors influencing Gotland consumers to shop online. Tese (Doutorado). Högskolan på Gotland. Disponível em: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.diva-portal.org/smash/get/diva2:420724/FULLTEXT01.pd

Tanure, B., A Carvalho Neto, A. Santos, C. M. M. & Patrus, R. (2014). Estresse, Doença do Tempo: um estudo sobre o uso do tempo pelos executivos brasileiros. *Estudos e Pesquisas Em Psicologia*, *14*(1). Disponível em: https://doi.org/10.12957/epp.2014.10480

Tarhini, A., Hone, K., Liu, X. &Tarhini, T. (2017). Examining the moderating effect of individual-level cultural values on users' acceptance of E-learning in developing countries: A structural equation modeling of an extended technology acceptance model. *Interactive Learning Environments*, 25(3), 306–328. Disponível em: https://doi.org/10.1080/10494820.2015.1122635

Tingiris, S. & Kinsella, B. (2021). *Exploring GPT–3*. Birmingham: Packt. E-book. Disponível em: https://learning.oreilly.com/library/view/exploring-gpt-3/9781800563193/B16854_FM_ePub_AM.xhtml

Zheng, J. & Li, S. (2020). What drives students' intention to use tablet computers: An extended technology acceptance model. *International Journal of Educational Research*, *102*. Disponível em: https://doi.org/10.1016/j.ijer.2020.101612

Wan Sulaiman, W. N. A.& Mustafa, S. E. (2020). Theory on exploring acceptance and adoption of digital textbooks: a guide for the book publishing industry. *Publishing Research Quarterly*, *36*(3), 381–398. Disponível em: https://doi.org/10.1007/s12109-020-09742-0

Wedari, L. K., Fatihah, A. N.& Rusmanto, T. (2022). Zoom application acceptance in online learning: An analysis with the technology acceptance model. *International Journal of Information and Education Technology*, 12(9), 821-830. Disponível em: doi: https://doi.org/10.18178/ijiet.2022.12.9.1690

Appendix

To consult the appendix, click on the link:
https://docs.google.com/document/d/1ozjdgOFVwFrM4nsePFmFGnta-i3TyqpN/edit?usp=sharing&ouid=108286190330611413061&rtpof=true&sd=true