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Research Article

Exploration of ChatGPT in basic education: Advantages, disadvantages, and its impact on school tasks

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ABSTRACT

The introduction of ChatGPT into basic education is progressing rapidly, generating impacts that, in many cases, are unknown. Its impressive capability profiles it as a tool that will revolutionize teaching and learning processes, creating gaps that need to be understood and evaluated. The research aims to explore the advantages, disadvantages, and its impact on school tasks. It is an exploratory qualitative study; data were collected through semi-structured interviews with 110 participants from five schools in Tacna, Peru. The results reveal that ChatGPT provides information quickly and easily, with a variety of content and pedagogical strategies. Additionally, it serves for evaluation, knowledge consultation, and scheduling school tasks. Eight related disadvantages were identified: Easy access to information may encourage the habit of copying and pasting, fostering academic dependence that would affect the development of skills, such as inquiry, argumentation, analysis, and critical thinking. Also, students may misuse information, cheating on school tasks and affecting their quality and suitability, making them no longer useful for education, including synthesis, essays, monographs, organizers, summaries, and mathematical exercises.

Keywords: ChatGPT, advantages, disadvantages, school tasks, basic education

INTRODUCTION

Basic education is crucial for individual development, providing us with knowledge and skills for success in society and active citizenship. Among them, school assignments are essential in the learning process (Kukliansky et al., 2016), also to assess students' understanding, foster critical and analytical skills, which facilitates said process (Cooper, 2007; Meng-Chun et al., 2020). These consist of completing assigned tasks either at home or in a location other than the school (Hong et al., 2004; Roderique et al., 1994). However, the introduction of artificial intelligence in the educational field through its various applications, such as ChatGPT, is bringing about significant changes in teaching processes. These changes involve innovations that require a redefinition in the way learning processes are approached (Javaid et al., 2023).

AI has advanced by leaps and bounds and has established itself as a multidisciplinary field seeking to develop systems capable of performing tasks that require human intelligence, increasingly complex and challenging (Barredo et al., 2020; Miller, 2019). In this way, ChatGPT is based on language models that allow

the generation of coherent, contextual, and human-like text. Its ability to understand and provide information has sparked growing interest in education (Alser & Waisbergb, 2023). It is identified as a form of generative AI due to its ability to produce original results with ease; through questions, it can provide information and even an opinion. Its inevitable presence in education confronts us with a phenomenon that requires investigation to understand the scope of its operation and evaluate the benefits and risks of its use (García-Peñalvo et al., 2024).

In previous works, opportunities and challenges of using ChatGPT have been discussed, with many providing a multidisciplinary view by analyzing contributions on both negative and positive aspects (Merón & Tekmen Araci, 2023). Regarding this, Dwivedi et al. (2023) argue that the technology in question demonstrates improvements in productivity but also poses risks to security and privacy when used inappropriately. On the other hand, Merón and Tekmen Araci (2023), in examining the strengths and weaknesses of this application, consider it a potentially useful tool for designing materials; however, they also point out significant ethical limitations and challenges.

Given the existence of risks, some educational institutions have decided to block access to the chatbot on school networks and devices, based on concerns related to plagiarism and the dissemination of inaccurate information (Lim et al., 2023). During the completion of academic tasks, there is a possibility that it could be used by students to copy and paste task solutions without the teacher having any control (Javaid et al., 2023). Similarly, Alarcón-Llontop et al. (2023), in a study on the advantages and disadvantages of using ChatGPT, warns about bias in the information it provides, mainly in the ethical realm, due to its use for cheating in exams and assignments. However, the future development of this new technology is no different from other technological innovations of the past, and it is considered to transform the value of knowledge (Kim & Wong, 2023), due to the massive information and diverse concepts it can provide to students for their learning (Paranjape et al., 2019).

Its ability to generate content quickly and efficiently can be beneficial for students (Merón & Tekmen Araci, 2023). However, the possibility that students may overly rely on this technology raises questions about the development of their own skills. This poses a risk to the integrity of the basic education system (Lancaster, 2023), considering that one of the most important strategies used by teachers is based on assigning school tasks or also known as research assignments or tasks. Traditionally, students are expected to carry out tasks by consulting books, publications, journals, etc., with the intention of creating summaries, syntheses, interpretations, among others. They then present their products in written or visual form, with the aim of promoting content learning and fostering the creation of work habits, commitment, and responsibility.

The emergence of ChatGPT as a freely available tool is relatively recent (Pllana, 2022), and at the same time, research in this field has proliferated (Chamorro-Atalaya, 2023). According to the literature review, most of the work has focused on higher education populations, with few studies conducted on school-level samples. It is also worth noting that the present study is based on the insights of teachers in this context, who make valuable contributions to understanding the implications of this AI application in this population, especially the repercussions that could arise in the future. On the other hand, the speed at which it is spreading and being used by students in basic education represents substantial changes that need to be understood. Hence, there is a need to assess impact of ChatGPT on school tasks and explore its advantages and disadvantages.

METHODOLOGY

Design

The study is based on exploratory research with a qualitative approach. From this perspective, the researchers seek to deepen their understanding of the impact of the ChatGPT phenomenon in basic education, addressing its advantages, disadvantages, and its influence on schoolwork. A design based on grounded theory is adopted, which aims to generate theory based on data obtained from interviews (Strauss & Corbin, 2002). The research was carried out in an educational context, where basic education schools have not implemented restrictive policies regarding the integration of ChatGPT in the teaching and learning

processes. In this educational environment it is open, students in primary and secondary education freely resort to various technological tools to carry out their schoolwork.

Participants

The sample is composed of basic education teachers, who have extensive knowledge of the educational reality due to their years of service and experience in the field. A total of 110 participants were selected from five educational institutions in the Tacna Region, Peru (Tacna has ranked first in school census evaluations for the last seven years). Of these, 20 are primary school teachers and 90 are secondary school teachers. Among the secondary school teachers, 16 are in science and technology, 20 in mathematics, and 54 in social sciences (personal development, social studies, art and culture, religion, communication, English, and education for work). A convenience sampling was used, interviewing only those teachers who attended the work meetings previously convened. As inclusion criteria, teachers with more than five years of experience and knowledge about the use of ChatGPT were selected.

Instrument

To meet the research objectives, a semi-structured interview was used as the data collection instrument. These interviews took place between November and December 2023 at the school centers, where elementary school teachers work, following prior coordination with them and the corresponding educational authorities. Responses were recorded both in the interview guides and in audio recordings, with the interviewee's authorization. The instrument addressed three categories of teachers' perceptions: advantages, disadvantages, and effects on school tasks. Based on these criteria, base questions were developed to address the interviews. The flexibility of the instrument allowed for follow-up questions to obtain the required responses.

The base questions for the interview were: What are the potential threats that the learning process faces with the emergence of freely accessible ChatGPT for students? What learning opportunities do you envision with ChatGPT? and What school tasks do you believe should be eliminated with the appearance of ChatGPT? In some cases, it was necessary to ask follow-up questions to obtain more complete answers, such as: Could you provide specific examples of how ChatGPT could negatively or positively affect the learning process? How do you think students could use ChatGPT to bypass a deep understanding of topics? How could ChatGPT facilitate the understanding of complex concepts through information visualization? or could you explain why you believe certain school tasks should be eliminated due to the emergence of ChatGPT?

Analysis

For the analysis of the information obtained from the interviews, the guidelines of grounded theory were adapted with the assistance of Atlas.ti 23 software. This approach allowed for greater coherence and rigor in the evolution of the analyses (Weitzman & Miles, 1995). It began with open coding, identifying literally the relevant and recurrent ideas in the respondents' answers. Such as, for example: "facilitates content generation," "speed and accuracy," "can lead to high technological dependence," etc. Descriptive codes were then assigned to each identified concept. For example, "creativity," "efficiency," "dependence," etc. Next, similar codes were grouped and compared to identify emerging patterns. For example, "content," "speed," and "efficiency" were grouped under the category "advantages," and "dependence" under the category "disadvantages."

Then, the ideas were refined to identify possible relationships and integration of concepts into categories (axial coding). For example, the relationship between "content," "speed," and "efficiency" as advantages of using ChatGPT. These, in turn, give rise to the axial code of "easy and fast access to information" as an advantage of its use. Finally, a network of codes was constructed to synthesize and clarify the connections between the concepts (Charmaz, 2006). During this phase, no emerging themes directly from the data were identified; the findings reported codes that were predefined, based on existing literature.

Table 1. Codes of advantages perceived in interviews

No	Codes	Frequency
1	Easy and quick access to information	33
2	Facilitates curriculum planning	27
3	Offers a variety of information and contents	22
4	Facilitates the planning of learning sessions	14
5	Facilitates evaluation	13
6	Develops pedagogical strategies	08
7	Serves to corroborate knowledge and strategies	04
8	Facilitates work or homework scheduling	03

RESULTS

The results are based on the interviews conducted with secondary school teachers. For the first two questions on the advantages and disadvantages, teachers were asked to express themselves from a strictly academic point of view. No bias was observed in the teachers' assessments, even though they are from different specialties. However, there were some teachers (five) who stated that they did not have much mastery of this technology, so it was necessary to provide feedback on the use of ChatGPT. During these brief training sessions, the teachers who were more proficient supported their colleagues, facilitating their learning. This knowledge was useful for them to be able to make their assessments in an objective manner.

Advantages

First, we present narrative excerpts from the teachers' responses during the interviews (5 responses were selected on the advantages). We then show the results of the coding of the responses (**Table 1**).

> B7: Primary education teacher with 10 years of service (09/21/2023): "It is very useful, it will facilitate the creation of learning sessions".
>
> B23: Personal development, citizenship, and civics teacher, with eight years of service (09/21/2023): "It offers speed to access information, program it and even develop practices with the subject".
>
> B49: Science and technology teacher, with 11 years of service (01/08/2023): "I consider that it shows many alternatives of strategy in a fast and precise way for our work".
>
> B61: Mathematics teacher, with one year of service (07/31/2023): "I can get several examples from basic to advanced level and in a fast way".
>
> B77: Communication teacher, with 30 years of service (10/08/2023): "I think it has advantages in terms of time, since it can help us with strategies and review of exams".

Among the advantages perceived by basic education teachers (**Table 1**) about the ChatGPT application, the easiness and speed of access to the information provided by this tool stands out most strongly (33 cases). This fact represents a significant time saving for both the teacher and the student, eliminating the need to search for books, magazines, or other traditional materials. From a pedagogical perspective, the second most mentioned advantage (27 cases) is the facilitation of curricular planning. From this, the fourth advantage is derived, which consists of the planning of learning sessions (14 cases), since it makes it possible to develop competencies and skills, provide a variety of examples that relate everyday experiences to theoretical knowledge, create practical and dynamic activities, as well as plan learning sequences, among other activities. The third advantage is related to the variety of content available (22 cases). In addition, the fifth advantage is very useful for evaluation (13 cases), as well as for the corroboration of knowledge and strategies (seventh advantage). In eighth place, they perceive that it can help in the programming of homework and schoolwork (three cases).

Table 2. Codes of perceived disadvantages in interviews

No	Codes	Frequency
1	Stimulates ease	32
2	Copy and paste (plagiarism)	27
3	Investigative skills	18
4	Undermines development of analytical and critical thinking skills	16
5	Academic dependence	14
6	Attempts against development of creativity	13
7	Attacks against the development of argumentation	8
8	Misuse of information	7
9	Use of erroneous information	6
10	Limits interaction with the teacher	5

Disadvantages

Below, we present narrative excerpts from the interviewees' responses on disadvantages, five responses were chosen. The results of the coding of the responses are shown in **Table 2**.

> A3: Mathematics teacher, with 18 years of service (01/08/2023): "According to my perception, the student will no longer perform the tasks conscientiously, since with this tool everything will be easy for him/her".
>
> A45: Communication teacher, 20 years of service (08/31/2023): "Maybe they can misuse or commit excesses, we can only make them reflect on a reasonable and responsible use".
>
> A10: English teacher, 16 years of service (09/21/2023): "There is a possibility that students may not want to make the minimum effort to generate or do their homework."
>
> A12: Science and technology teacher, 11 years of service, (09/22/2023): "A high dependency can be generated in students, not allowing them to make their own arguments".
>
> A5: Mathematics teacher, 25 years of service (09/25/2023): "There is a possibility that students use the information as it is generated by ChatGPT without any subsequent filter".

Table 2 shows 10 disadvantages perceived by secondary education teachers. The one that reports the highest incidence is fascism (32 cases), related to the ease with which students can obtain the work ordered through ChatGPT. Secondly, teachers consider that its use encourages the tendency to copy and paste (27 cases), since this automated tool would replace the work of compiling data. Even if the content generated is unique, it could lead to acts of plagiarism that are difficult to detect by plagiarism detection programs. Third, students could limit their research skills (18 cases), as the tool provides them with the information without requiring searching in books, journals, magazines, publications, and other sources. In addition, teachers expressed concern that this would affect the development of essential skills, such as analysis, critical thinking, creativity, and argumentation.

Likewise, the fifth disadvantage is the risk of technological dependence (14 cases), as students could become accustomed to consulting only ChatGPT. Finally, the ninth disadvantage refers to the risk of using erroneous information (six cases) provided by this technology, and the tenth disadvantage is the lack of interaction with the teacher (five cases) is a risk to be considered.

Figure 1 shows the cloud of the most frequent words used in the responses of basic education teachers to the question: What type of homework should be eliminated in the face of the use of ChatGPT by students? The word "monographs" (25 cases) stands out among the others. Teachers consider that this type of work will be affected as a priority and should be eliminated as homework. These works are commonly assigned by teachers to students and are known by names such as homework, assignments, or research work.

In second place comes "summarizing" (16 cases), which consists of synthesizing the main ideas of a text faithfully, without changing or inserting personal opinions. It is a task widely used by teachers to reinforce

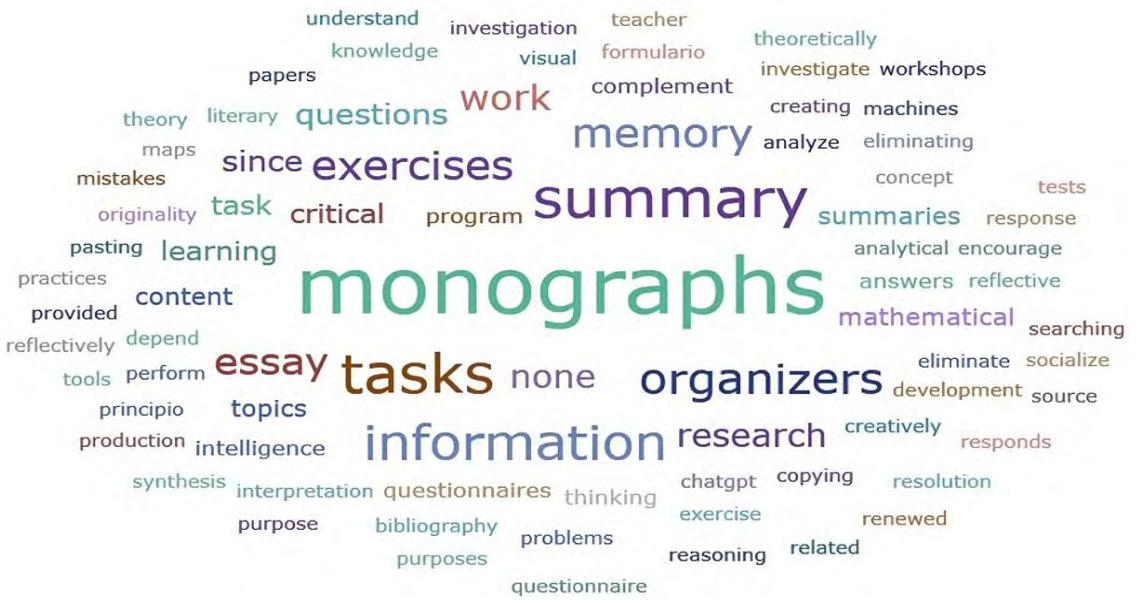

Figure 1. Word cloud of homework assignments at risk of being eliminated (Source: Authors, using ATLAS.ti 24 software)

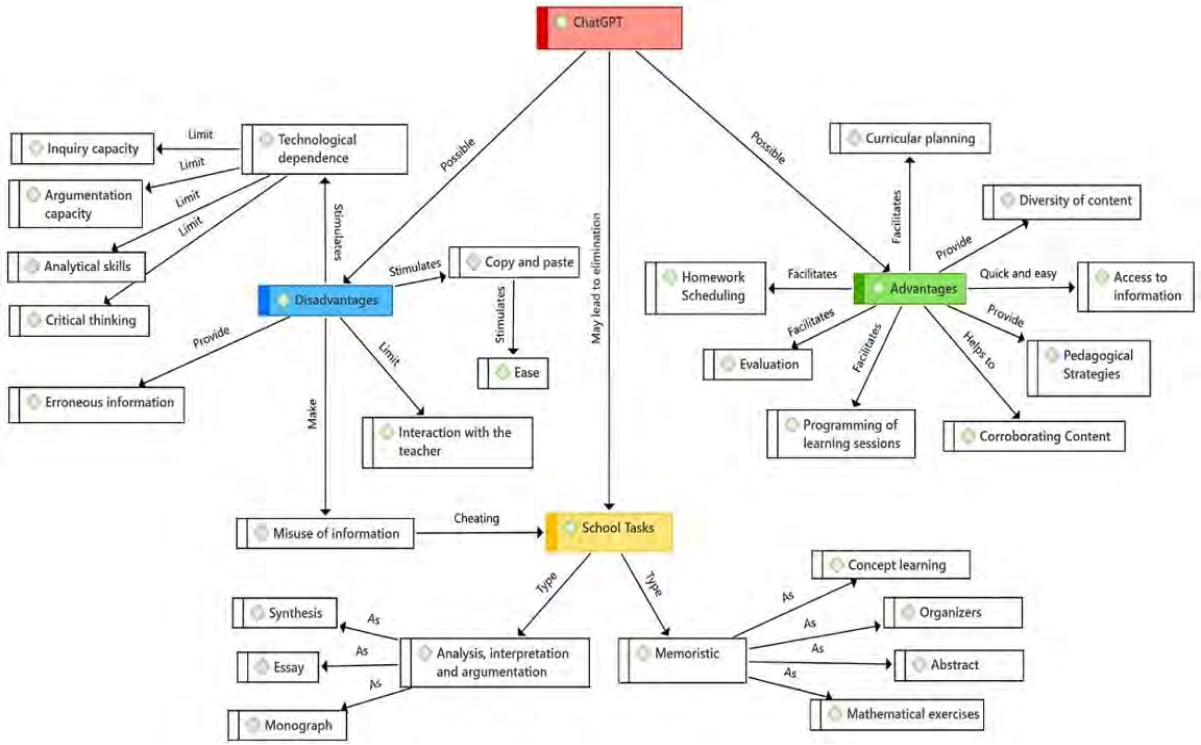

Figure 2. Code network of advantages, disadvantages, & affected school tasks (Source: Authors, using ATLAS.ti 24 software)

reading and learning skills on a topic. In third place, the word “exercises” is distinguished (10 cases), which includes mathematical exercise tasks and those aimed at memorizing a concept.

Another task that teachers consider should be eliminated are “graphic organizers” (10 cases), which involves creating a visual graphic representation of knowledge on a topic, such as maps or diagrams. In fifth place, the “essay” is mentioned (nine cases), aiming to consolidate knowledge through exploration, analysis, interpretation, and evaluation of a topic. Less frequently, the term “questionnaires” (six cases) is observed, referring to any type of assignment based on a series of questions that students must answer by searching for information.

Figure 2 shows code network of advantages, disadvantages, and affected school tasks.

DISCUSSION

The study describes the advantages, disadvantages, and impact that the use of ChatGPT will have on school tasks within the scope of basic education. The results indicate that this artificial intelligence technology presents significant potential that is in the process of integration in this educational environment.

The study reveals advantages (eight), disadvantages (10), and a set of tasks (eight) that could be affected using ChatGPT in the student population. These findings are important because teachers' perceptions are valuable indicators. Being in direct contact with students, they absorb all experiences in their daily interactions and continually observe trends and changes throughout students' school life.

Below, we will systematically discuss the findings regarding the advantages, disadvantages, and impact on tasks of using ChatGPT in the school context:

Advantages

Among the reported advantages, the most prominent was easy and quick access to information, resulting in time savings in educational tasks. Teachers and students have efficient technology to streamline efforts in completing schoolwork. Additionally, there is the advantage of having access to a variety of knowledge by simply giving instructions or asking questions. ChatGPT will respond in a conversational manner, providing summaries of information from databases, books, magazines, and other sources (UNESCO, 2021). Teacharungoroj (2023), in investigating what this tool can do, reaches the same conclusion, arguing that its use provides a rich database easily accessible, enabling the development of academic work efficiently and coherently. Similarly, Carrasco (2023), in research aimed at creating content for teaching modern history to secondary school students, concludes that ChatGPT has the advantage of providing a wide variety of theoretical content and practical activities.

The repetition of similar conclusions by several researchers increases confidence in the results of this research; however, it is important to consider possible limitations or ethical considerations associated with its use.

Another advantage is that it facilitates teaching work in terms of planning, especially regarding learning sessions. This advantage is complemented by the sixth advantage when interviewees indicate that this technology can provide a variety of pedagogical strategies and can even personalize learning, as appropriate. Zhu et al. (2023) agrees with the perception of secondary school teachers, testing ChatGPT to generate a personalized study plan for computer coding learning for 30 minutes per day for a year. Baskara and Mukarto (2023) also argue that it can prepare teaching materials, such as realistic dialogues, news articles, or reading passages. Teachers also highlighted its usefulness for conducting learning assessments in the school population. Similarly, other authors (Cotton et al., 2023; Zawacki-Richter et al. 2019) highlight the potential of this tool for assessment.

The findings of the study support previous research by demonstrating that ChatGPT facilitates teaching work, personalizes learning, and generates educational materials. However, it is crucial to monitor the reliability of the responses provided by this tool, as despite technological advancements, errors or biases may arise in the generated responses, which could affect the quality of the material produced by these means and even foster certain conceptual errors in teachers and students.

Disadvantages

The first perceived disadvantage among teachers is the ease with which assigned tasks can be completed, as students may simply copy and paste (second disadvantage) the information provided by the AI without much effort. These disadvantages relate to the eighth disadvantage, which relates to the misuse of information; by copying and pasting in the development of their work, students may engage in plagiarism and obtain evaluations by cheating. In this regard, Rajabi et al. (2023), in interviews with post-secondary computer science students, also warn about the risks of plagiarism when obtaining information very easily to complete assignments.

Similarly, Jarrah et al. (2023) highlights the need to prevent the high possibility of plagiarism during the preparation of academic work. There is even an assumption of plagiarism in articles generated by ChatGPT

(Chatterjee & Dethlefs, 2023; Khalil & Er, 2023). Although Xiao and Zhi (2023) reported that students consider it a valuable companion in language learning as it helps complement learning.

Similarly, many researchers have concluded on the benefits of these technological advances and their inclusion in learning processes in various fields of knowledge (Ghafouri, 2024; Ray, 2023; Sallam, 2023). The findings indicate concern among teachers about the ease with which students can access information through ChatGPT, which could result in academic plagiarism practices. Despite these concerns, some studies suggest that this tool could have educational value in various areas of learning. The potential benefits of these technologies in the teaching-learning process are highlighted, although it is essential to address the pedagogical challenges associated with their integration in the classroom.

Other disadvantages perceived by teachers include the impact on the development of a set of skills that have traditionally been worked on in the basic education system. Among these disadvantages are research skills (third), analytical abilities, critical thinking (fourth), creativity (sixth), and argumentation skills (seventh). Aristovnik et al. (2024) reached the same conclusion in a study conducted with management students; they found that when using ChatGPT, students felt a high concern about their development of critical thinking, creativity, and personal communication competencies. Similarly, in another study conducted with nuclear medicine course students, they also inferred that the potential applications of this technology limit the development of research and writing skills (Currie & Barry, 2023). Findings indicate that the use of ChatGPT can negatively affect the development of important skills in students, posing significant challenges for basic education and other fields of study.

The fifth disadvantage that could manifest in secondary education students is technological dependence, stemming from passivity in the learning process. By receiving quick and easy answers that require no effort, there is a tendency to depend on this technology for completing academic assignments. In a sample of teachers and higher education students, the objective was to explore the advantages and challenges of ChatGPT compared to other information platforms (Sahari et al., 2023). It was revealed that students had a marked preference for this tool, to the extent of categorizing it as a negative aspect of their education due to the risk of excessive dependency, as academic work can be easily obtained.

The ninth disadvantage identified by teachers is the risk of using inaccurate information. In this regard, UNESCO (2023) also warns that this tool provides information available in databases and publications on the internet, which can be true or false. The ability to distinguish the suitability of the information provided by ChatGPT can affect the quality of academic work. Additionally, the limited interaction with the teacher is perceived as a disadvantage. García-Peñalvo et al. (2024), in his work on the new reality in education in the face of AI, also highlights how this can negatively affect the development of student communication and interaction with teachers and peers. These findings highlight the urgent need for teachers to acquire solid technical skills to evaluate the information presented by students and guide them in this process. In addition to familiarizing themselves with these tools, it is important for them to know how to effectively integrate them into the educational environment to promote meaningful communication and collaboration.

Impact on School Tasks

The main concern about the impact of ChatGPT on basic education revolves around school tasks. The term paper, known in schools as research papers or assigned tasks, seems to be the most affected and could be phased out in the short term as a pedagogical strategy. In addition to the term paper, other tasks such as summaries, exercises, mainly mathematical ones, and organizers would also be affected. Other studies also conclude that this technology can generate essays, summaries, term papers, and solve mathematical exercises, tasks that teachers usually assign to students (Cotton et al., 2023; Lo, 2023). For example, Khalil and Er (2023) requested ChatGPT to generate 50 essays and, as a result, obtained writings that were then subjected to plagiarism review. Half of them showed an average similarity of 13.72%, while the other half had an average of 8.76%. From this, it can be deduced that these papers could be considered highly original.

On the other hand, Lancaster (2023) demonstrated that this technology is accessible to non-specialized users and can produce essays, reflective analyses, marketing strategies, and even slides for presentations in a matter of seconds. The results highlight concerns about how ChatGPT affects school tasks, especially term papers and other academic assignments. The ability of this technology to generate academic content raises

questions about the authenticity and quality of the produced work. Therefore, it is necessary to critically address the potential impacts of ChatGPT on education and promote pedagogical strategies that foster fundamental skills such as creativity and critical thinking.

CONCLUSIONS & LIMITATIONS

The use of ChatGPT in basic education holds great potential to complement the work of teachers and students. It allows quick and easy access to information, representing significant time savings for both teachers and students. Additionally, it offers a diversity of content that facilitates the planning of learning and assessment sessions.

It serves as a supportive platform by having the capacity to generate a variety of pedagogical strategies, even personalized ones. It is also useful for confirming knowledge and scheduling school tasks. However, it poses a series of challenges and risks that must be addressed with responsibility and ethics. Easy access to information can foster the habit of copying and pasting work, claiming authorship without any effort. This can lead to academic dependence, affecting fundamental skills developed in basic education such as inquiry, argumentation, analysis, and critical thinking. There is a risk that students will misuse the information provided by ChatGPT, cheating on school tasks, and affecting the quality and suitability of the assignments assigned by teachers. Some tasks would become useless for educational purposes, including synthesis, essays, term papers, organizers, summaries, and mathematical exercises.

In this context, it is imperative that school administrators, in collaboration with teachers, develop clear guidelines and institutional policies on the ethical and responsible use of ChatGPT and other AI technologies in the educational environment. These guidelines should address crucial aspects such as academic integrity, student privacy, and information security. Furthermore, it is essential for teachers to design educational activities that promote the development of skills such as creativity, critical thinking, complementing the use of technologies like Chatbots with active and participatory pedagogical approaches. Similarly, they should implement comprehensive assessment methods that not only measure students' knowledge and understanding but also their abilities to apply, analyze, synthesize, and evaluate information critically and reflectively, thereby reducing the risk of plagiarism. Additionally, mechanisms for monitoring and evaluation are required to analyze the impact of ChatGPT and other technologies on student learning and development, as well as the effectiveness of pedagogical practices and associated institutional policies.

The conclusions are based on the perspective of a group of elementary school teachers with limited proficiency in the potentialities of this tool, which they are still exploring. Future studies could include broader samples to enrich perspectives and experiences with ChatGPT. Its usage is growing rapidly, and currently, secondary schools have not established restrictive policies or measures to counteract the effects of this phenomenon. However, it should be noted that this technology will revolutionize teaching and learning methodologies in the next decade (Gates, 2023).

This study reveals a significant gap between optimistic and unfavorable opinions, highlighting the urgent need for attention from educational stakeholders. It can serve as a precursor to debates by introducing underexplored elements and laying the groundwork for future research to gain a deeper understanding of the advantages and disadvantages of integrating ChatGPT into elementary education. It's important to continue exploring the potential of this technology to develop innovative educational proposals. Therefore, future research could focus on how easy access to information with ChatGPT impacts the development of students' key cognitive and social skills, including inquiry, argumentation, analysis, and critical thinking. This would allow the identification of pedagogical strategies to mitigate potential negative impacts and evaluate the effectiveness of ethical and responsible use policies. Additionally, longitudinal studies are needed to better understand how continued use of ChatGPT, and other AI technologies affects student learning and development over time.

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The authors further declared that the study was approved by the institutional ethics committee of the Jorge Basadre Grohmann National University on April 19, 2023 (Approval code: 2023-010-CEIUNJBG). Written informed consents were obtained from the participants.

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Data availability: Data generated or analyzed during this study are available from the authors on request.

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