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Use of ChatGPT in Education: Future Strategic Road Map with SWOT Analysis

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Research Article

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Abstract

Background/Purpose: Integrating artificial intelligence tools within educational settings has generated considerable debate, yet empirical research that offers implications of its usage remains scarce. This study aims to qualitatively assess the perceptions and experiences of school principals and teachers regarding the use of ChatGPT in K-12 schools, focusing on the potential benefits and challenges.

Materials/Methods: Using a SWOT analysis framework, semi-structured interviews were conducted with 17 teachers and four school principals to explore participants' insights and perceptions about the strengths, weaknesses, opportunities, and threats associated with using ChatGPT in education.

Results: The findings suggest that ChatGPT positively contributes to learning by providing personalized feedback, encouraging collaborative working, and supporting content-rich learning environments. It also contributes to the improvement of writing and language skills by providing continuous feedback to both students and teachers. However, concerns have been raised regarding ethical issues such as data privacy, security, plagiarism, bias, and the potential for commercial exploitation, as well as negative psychological impacts on users.

Conclusion: The study provides important early evidence on the integration of AI in education, highlighting both potential benefits and significant ethical challenges. The findings contribute to the existing literature by providing a detailed examination of the practical and ethical implications of using AI tools such as ChatGPT in educational settings. Further research is recommended to further explore these issues and guide effective AI integration in schools.

1. Introduction

Artificial intelligence (AI)-based applications that can understand human language and establish human-like dialogue have led to the emergence of natural language processing systems (Ouyang et al., 2022). These systems are capable of imitating human intelligence, interacting with people, answering their questions, and helping to inspire them (Farrokhnia et al., 2023). AI has rapidly gained in popularity across a wide range of fields due to its fast generation of realistic output (e.g., ideas, reports, predictions, scripts, personalized recommendations, and programming code) in response to specific user requests (Caldarini et al., 2022). As a result, AI has become in great demand across fields such as health, transport, tourism, security, and education (Mich & Garigliano, 2023; Singh, 2023; Wandelt et al., 2023).

One of today's most popular AI applications is ChatGPT (Chat Generative Pretrained Transformer) developed by OpenAI. ChatGPT is defined as an artificial intelligence model capable of understanding and generating human-like text based on user input. It is based on a state-of-the-art language model and has been constructed from a significantly large dataset using deep learning techniques (Lo, 2023). In this way, ChatGPT is able to understand user input in natural language and in response generates real-time answers to complex questions (Zhu et al., 2023), demonstrating high-level performance in generating coherent and informative text and providing solutions for complicated tasks (Tlili et al., 2023). These advanced features of ChatGPT have sparked both admiration and concern within the education community, as well as in other fields since OpenAI launched the product in November 2022 (Alabool, 2023). ChatGPT provides functionality that can translate languages, create scientific articles to a certain degree, summarize text, as well as offer advice and support students with their schoolwork. This broad-based functionality has inspired academics to investigate the potential uses of ChatGPT (Khan, 2023). Accordingly, the current study's aim was to examine the strengths and weaknesses, as well as opportunities, and threats of using ChatGPT in education, by way of a SWOT analysis based on the perceptions and experiences of both school principals and teachers.

Use of ChatGPT in Education

Technological products such as wikis, YouTube, and Google's various online services that include a popular search engine, web browser, email, cloud storage facility, and a translation application, have become important tools that have increased our daily access to information, communication, and education over the past two decades. However, the introduction of certain digital technologies has also triggered various debates dominated by fear and anxiety (Hoofnagle, 2009). Unsurprisingly, this has also been the case for ChatGPT, an artificial intelligence-based technological tool which overnight has impacted many areas of modern-day life. One reaction, for instance, was to seek to ban the use of ChatGPT in education, as has happened in New York's public schools and in the Australian states of both Queensland and New South Wales, due to concerns that educational practitioners would violate established ethical practices and that its usage would negatively affect teaching and learning.

Although the use of ChatGPT has raised some concerns, it is undeniable that the product will likely play an important role in the future of education (Ali et al., 2023), since it can be used to support students in their writing, skills acquisition, and for completing homework and project tasks. It can also be used to help teachers and other educators in numerous ways, such as in the development of teaching materials and resources, offering suggestions regarding lesson design, helping to improve students' individual learning experiences, and providing feedback personalized according to students' interest and ability levels (Trust et al., 2023). ChatGPT, as an innovative product that has triggered both feelings of approval and unease worldwide, has raised various uncertainties based on issues such as how and to what extent technology should be used in education, ethical issues on its

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usage, changes it may create in teacher-student relationships, and how it could reshape learning processes over the long term.

While the increasing number of studies on the use of AI in education is certainly indicative of a growing interest in the potential for such technologies, significant gaps still exist for this area in today's academic literature. First, having conducted systematic reviews on AI applications, some researchers have indicated that research in this area has not been methodologically rigorous enough, nor sufficiently comprehensive (Caldarini et al., 2022; Karaköse, 2024; Lo, 2023). Second, although studies that have assessed the strengths and weaknesses of AI's use in the education context have employed strategic assessment tools such as SWOT analysis (Abujaber et al., 2023; Farrokhnia et al., 2023; Loos et al., 2023), these studies have generally been secondary analyses based on the existing literature, rather than providing their own in-depth empirical findings on the practical experiences of educators. Third, the majority of existing studies have focused on specific areas such as AI's usage within higher education or in medical education (Meyer et al., 2023; Rudolph et al., 2023; Singh, 2023), whereas research at the K-12 level has been relatively limited. This has led to a significant knowledge gap regarding how AI applications are experienced and perceived by K-12 teachers and school principals. Finally, the existing literature has concentrated mostly on the technological functioning of ChatGPT (Ali, 2023; Zhai, 2022) and has lacked focus based on concrete and contextual data regarding issues of its use in the field.

The purpose of the current study, therefore, is to address the empirical research gap regarding the use of ChatGPT within the context of K-12 education. Accordingly, both the positive and negative aspects of integrating ChatGPT in education are comprehensively analyzed through SWOT analysis based on qualitative interviews held with both school principals and teachers. The study goes beyond pure theoretical analysis, providing original data based on the direct experiences of frontline educators. More specifically, it offers original insights into how ChatGPT is perceived in the K-12 educational environment, the challenges encountered with its implementation, and the opportunities it has provided. In this respect, the current study aims to serve as a guiding resource for both educators and educational policymakers on the applicability of artificial intelligence in K-12 schools.

2. Methodology

The qualitative case study method was employed in order to reveal how teachers and school principals with extensive knowledge of AI tools explain/see the (i) strengths, (ii) weaknesses, (iii) opportunities, and (iv) threats of using ChatGPT within K-12 schools.

2.1. Participants

The participants of the study were determined by the criterion sampling strategy, which involves examining cases that meet predetermined criteria (Patton, 2002). The main criterion in terms of the current study was that selected participants (both teachers and school principals) should have extensive prior experience using ChatGPT applications for teaching and/or administrative purposes. Accordingly, four school principals and 17 teachers who agreed to participate in the study and met this criterion were selected. The average age of the participants was 35.75 years, and 76.4% of them were male.

2.2. Data Collection

Two stages of data collection were administered. During the first stage, potential participants who had previously used AI applications within their educational activities were identified. At this stage, a total of 102 school principals and teachers were sent an information form explaining the purpose and content of the research. Additionally, the form asked whether and to what extent they had used AI applications for educational purposes, with the aim being to determine participants that could fit the sampling criterion.

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During the second stage, semi-structured face-to-face interviews were conducted with those who were selected as the study's participants. Face-to-face interviews were preferred since they allow for a more in-depth level of data collection, and participants could be encouraged to respond with more confidence and care (Schober, 2018). Prior to each interview, the participant was provided with detailed information about the research process being followed. The participants were also asked to confirm that they were taking part in the study voluntarily and were asked to sign an informed consent form to this effect since the research was conducted in accordance with the Declaration of Helsinki.

The interview protocol included four open-ended questions about the participants' experiences of using ChatGPT. Each interview was conducted by the current study's primary author, who themselves has extensive knowledge and experience of using AI software. The interviews were completed within one class hour (40 minutes) on average and were held on site at the schools where the interviewees worked.

2.3. Data Analysis

Following completion of the interviews and the subsequent transcriptions, the data were analyzed by two researchers working independently. The purpose of the content analysis being to scientifically process the collected "raw" data obtained from the participants to create a body of knowledge. Content analysis aims to produce valid, repeatable, and objective inferences about the participants' responses during their respective interviews based on clear rules (Prasad, 2008). The content analysis codes and categories obtained from the two researchers were then compared and any disagreements resolved. During this process, the data were divided into meaningful categories in line with the determined codes. Then, the categories were assigned among four thematic groups in accordance with the SWOT (strengths, weaknesses, opportunities, and threats) framework. This four-dimensional SWOT structure facilitated the researchers in analyzing the data.

Several measures were taken to ensure validity and reliability of the collected data. First, gathering data from both teachers and school principals (data triangulation) allowed for different perspectives to be examined on the same phenomenon; while having two different researchers analyzing the data independently (researcher triangulation) helped to support the reliability of the qualitative findings (Merriam, 2015). Second, detailed information regarding strategies employed to select the study's participants, their characteristics, as well as the use of direct quotations helped to ensure transferability (Sharts-Hopko, 2002). Third, member checking and peer debriefing were also applied as recommended to support credibility (Glesne, 2011; Merriam, 2015), with a focus group interview conducted with five participants to check the findings following completion of the interview data analysis. Additionally, two volunteer experts were also involved in reviewing the qualitative data analysis process. Finally, findings were revised in line with the feedback from both the participants and volunteer experts.

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3. Results

Consistent with a SWOT analysis, the results were combined under the four constituent headings: Strengths, weaknesses, opportunities, and threats of using ChatGPT within educational organizations.

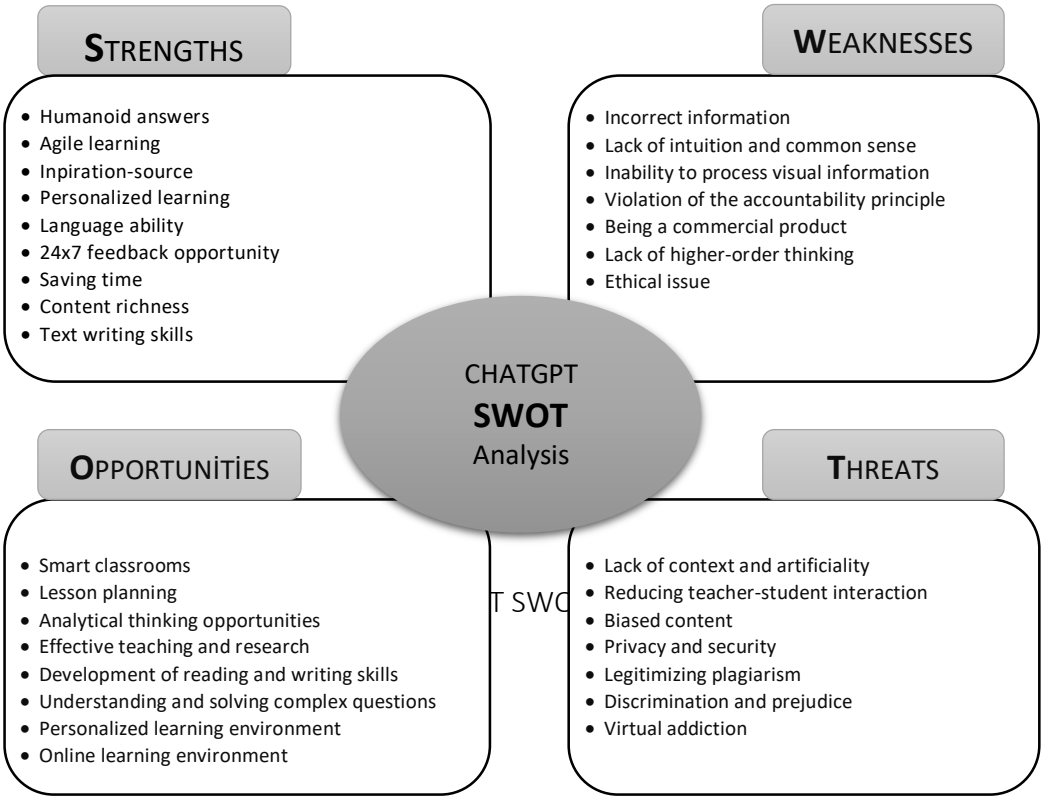

Figure 1. illustrates the participants' different views and concerns regarding the integration of ChatGPT into education.

3.1. Strengths of ChatGPT

The participants indicated that the strongest aspects of ChatGPT were its humanoid-type answers, personalized learning, agile learning, text writing skills, saving time, inspiration-source, 24x7 feedback opportunity, language ability, and content richness.

Humanoid answers: ChatGPT was thought to provide significant benefit to students and teachers through its ability to provide humanoid-type answers to questions. The participants indicated that it had many helpful features such as creating answers according to current questions and requests, preparing lecture notes and exam questions, and solving mathematical problems.

> *ChatGPT responds to my questions in a way that makes it feel like I'm talking to a real person. Its answers are both detailed and easy to understand, as if I'm conversing with a colleague.* (P11)

Personalized learning: ChatGPT allows participants to choose the learning methods most suited to them. It provides teachers and principals with opportunities to acquire new skills, learn new subjects, take up new hobbies, and to gain new experiences.

> *I was having difficulty in finding original content when I was going to set homework inthe lessons I taught to students. I was even spending a lot of time. A friend of mine suggested this application. At first, I was prejudiced because I thought it would give absurd answers. I have been using it for about 4 months. As a Turkish teacher, I have received very serious content such as composition, short essays, stories, etc.* (P19)

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Agile learning: ChatGPT offers a productive learning environment which helps educators focus on topics they struggle with or have an interest in, tracking their learning progress, and receiving feedback.

> *Accessing information with this application takes only a few minutes compared to before. I think it will bring much more benefit to both us and the students.* (P15)

Text writing skills: ChatGPT helps teachers and school principals to generate content for a variety of purposes, such as writing emails, creating lesson plans, drafting an academic text, or preparing a test or quiz. It can produce original and innovative content using its own words and knowledge.

> *I am doing my master's degree. I think ChatGPT has had a great effect on my text writing skills.* (P6)

Saving time: The interviewees suggested that AI helped educators save time and effort. It enables them to quickly and easily access the desired information, avoid unnecessary searching or repetition, optimize their workflows, and increase their productivity.

> *As a math teacher, setting quizzes after teaching a subject is very instructive. It takes a lot of time to do this for each class, so I get help from ChatGPT in this regard.* (P17)
>
> *I consider it as an opportunity to strengthen the educational aspect as it lightens the teaching workload of teachers.* (P1)

Inspiration-source: AI offers content that inspires and motivates teachers according to their interests and curiosities. For example, teachers can produce various different types of instructional content using ChatGPT, such as poetry, stories, code, essays, and songs.

> *I don't know if this happens to you too. Sometimes when I want to write something, I can't think of anything. In this case, using ChatGPT really helps a lot.* (P9)

24x7 feedback opportunity: The participants indicated that unlike teachers, ChatGPT is capable of continuously providing students with feedback in order to help improve their work. It can also help students to self-evaluate their own work, correct their mistakes, and offers suggestions for improvement.

> *I think that when students ask a question to the teacher, they ask the second question according to the psychological reaction they get (e.g., when I answer energetically, the student wants to talk more). Since ChatGPT does not know what it means to get tired, it can answer continuously.* (P18)

Language ability: ChatGPT enables teachers to convert visual content into digital format, edit it, and access information in their preferred language, which helps them to overcome any language barriers. These processes are an effective tool, especially when photo translation is needed. It can be particularly helpful for language teachers.

> *It is an application that I use and recommend to my students so that they can improve their language skills interactively during English lessons.* (P21)

Content richness: Five of the participants highlighted that ChatGPT is content-rich, allowing educators to save and share content they have created or liked, and to access other educators' content (e.g., exam questions and essays).

> *It allows me to access scientific studies written on a subject in the shortest way.* (P12)

3.2. Opportunities of ChatGPT

The participants' responses concerning the opportunities of using ChatGPT were categorized as smart classrooms, lesson planning, effective teaching and research, understanding and solving complex questions, personalized learning environment, online learning environment, analytical thinking opportunities, and the development of reading and writing skills.

Smart classrooms: The teachers mentioned that ChatGPT increases students' engagement and interest in lessons and that it provides them with interactive, rich content as well as real-time feedback.

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English, music, and sports classes are created in schools. In this era when technology is used so intensively by students, I think there should be smart classrooms in our schools. (P18)

Lesson planning: ChatGPT helps teachers plan lessons and suggests alternative resources and methods. It can also prepare plans that are appropriate for a curriculum focused on students' mathematical thinking. For example, ChatGPT can provide advice to teachers to choose problems involving higher-order thinking or to create their own problems.

I am a Turkish teacher and currently doing a master's degree. ChatGPT has helped me find many activities while explaining grammar and designing the course content. (P16)

Effective teaching and research: The teachers indicated that ChatGPT can provide teachers with the most up-to-date information and introduce them to new teaching methods or techniques. It can also help teachers to evaluate or improve their own work.

I think it is an effective classroom environment thanks to applications such as ChatGPT, because it helps students learn and improve a lot in just a short time. (P9)

I can say that this practice gives students both courage to face difficulties and curiosity to learn. (P17)

Understanding and solving complex questions: The teachers indicated that AI applications can provide students with opportunities to understand and solve complex questions and offers students the necessary knowledge or skill to solve questions or direct them to conduct further research.

One of the biggest challenges I encountered in my profession has been teaching students how to answer complex questions, since such questions require both a multifaceted approach and deep thinking. But with ChatGPT, I can more easily help my students look at complex questions from different perspectives and to think critically. (P13)

Personalized learning environment: Six of the participants stated that ChatGPT offers students a personalized learning environment since it can recognize students' interests, needs, learning styles, and levels and provide them with appropriate content and activities. ChatGPT allows students to learn at their own pace and in the way they prefer.

With ChatGPT, my students can learn at their own pace, in their own way, and on topics of their own choosing. ChatGPT guides students on their personal learning journey. (P18)

Online learning environment: It was indicated that ChatGPT could enable students to attend classes or access resources via the Internet. It can facilitate students to communicate or collaborate with other students or teachers. For example, ChatGPT can enable students to ask or answer questions in an online forum or to encourage them to undertake group work.

I think it provides online learning opportunities very well. New professions are emerging over time. I think if we can give students the ability to use applications such as ChatGPT in education, they can have more of a say in these new professions. (P16)

Analytical thinking opportunities: AI applications can provide opportunities for students to acquire analytical, innovative, creative, and critical-thinking skills. For example, ChatGPT can present students with a graph and ask what it means, or present them with a scenario and ask them to come up with alternative solutions.

I am a Turkish teacher. I was having a hard time teaching students' skills such as cause-effect relationships and how to analyze text. ChatGPT's ability to provide comprehensive explanations and answers in a short time has contributed significantly to the development of students' perspectives. (P19)

Development of reading and writing skills: Four of the participants mentioned that AI can provide students with opportunities to improve their reading and writing skills. It can offer students a variety of text types and teach them about different reading strategies.

I am a literature teacher. I did not know who to ask for the evaluation of some of the texts I had written. Therefore, I could not continue some of my studies. But applications such as ChatGPT have enabled me to make serious progress in a short time by giving quick feedback. (P21)

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3.3. Weaknesses of ChatGPT

The participants stated the weaknesses of ChatGPT as incorrect information, ethical issues, violation of the accountability principle, being a commercial product, lack of intuition and common sense, inability to process visual information, and lack of higher-order thinking.

Incorrect information: Both the teachers and school principals were highly critical of the accuracy of information produced by ChatGPT. They indicated that it may produce information that is not always accurate or reliable, and often does not even indicate its sources or references.

> *ChatGPT sometimes gives incorrect information. There were times when I received an unexpected and wrong answer to a question I thought was straightforward.* (P13)

Ethical issues: The participants suggested that while ChatGPT may provide unethical answers or make decisions due to conflicting or ambiguous values, norms, or principles, it cannot use moral judgment to consider individual or societal benefit. For example, ChatGPT may subsequently share your own input with other users as its own.

> *In such applications, caution should be taken against the possibility of obtaining private information.* (P9)
>
> *The fact that the answers given by students and by ChatGPT are similar makes it very open to abuse.* (P2)

Violation of the accountability principle: ChatGPT is not held accountable for its actions. Therefore, the security and transparency of the information it provides do not comply with the required ethical standards and therefore should not be sanctioned.

> *ChatGPT seems to give answers without human intervention. For this reason, it seems impossible to legally question its answers. Evil-minded people can exploit this system for illegal purposes to seek commercial gain.* (P4)

Being a commercial product: ChatGPT is a product or service that is produced or offered for sale and has been created to make a profit in accordance with market demands. ChatGPT is not obliged to observe any quality standards, nor consumer rights or ethical rules.

> *The fact that ChatGPT is a commercial product may disrupt equality of opportunity in education, since I think that underdeveloped countries that lack even basic Internet access will be ignored in this process, just as in the past.* (P5)

Lack of intuition and common sense: Another point highlighted by the participants was that ChatGPT lacks logical and rational-thinking skills. It may have difficulty understanding context, intention, or emotion, and has an inherently poor ability to respond according to the age, gender, and social and cultural circumstances of schools, leading educators to question its usage in the classroom environment.

> *Since AI does not consider cultural, social, and psychological contexts in its responses, it can give very artificial sounding answers.* (P16)

Inability to process visual information: The teachers stated that ChatGPT cannot understand and interpret visual materials. It cannot obtain information from visual tools, nor present information using visual tools. In other words, it cannot analyze the purpose, content, or message of visual information, which makes it harder for teachers to use in classes that require interpretation of visuals.

> *I am a geometry teacher. I cannot make much use of ChatGPT because we need to draw in cases where the questions are visual. ChatGPT does not provide information based on visual data.* (P7)

Lack of higher-order thinking: The participants indicated that ChatGPT lacks abstract, complex, or creative-thinking skills and therefore cannot perform mental functions such as problem solving, critical thinking, or creative thinking. It also lacks the cognitive flexibility necessary to understand new information, to make connections, and to generate certain alternatives.

> *I think that this practice and similar ones will dumb down students in a way like machines that only give flat information, who cannot analyze information to any real depth, and where artificiality comes to the fore.* (P8)

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3.4. Threats of ChatGPT

The participants stated the potential threats of using ChatGPT as lack of context and artificiality, reducing teacher-student interaction, biased content, legitimizing plagiarism, privacy and security, discrimination and prejudice, and virtual addiction.

Lack of context and artificiality: AI applications may not fully understand or reflect the context of the person they are corresponding with, or the topic being talked about. ChatGPT may provide unrealistic or inappropriate answers, make invalid decisions, or may ignore people's emotions, culture, or values since it cannot perform independent Internet-based research, but only presents information based on what it learns from its own dataset.

> *ChatGPT sometimes misses the context, and its responses can feel pretty artificial and shallow because of that. It doesn't really give the sense of a real conversation.* (P10)

Reducing teacher-student interaction: The teachers and school principals indicated that ChatGPT may weaken students' communication or connection with their teachers. It may prevent students from trusting, respecting, or receiving support from their teachers.

> *I think that the teacher-student relationship will change as such applications become more widespread among students since they will no longer see their teachers as the authority in knowledge. It seems impossible for teachers to counter a machine that provides continuous feedback and communicates whenever it wants.* (P11)

Biased content: It was indicated during the interviews that ChatGPT may produce or disseminate content that is biased or misleading. ChatGPT does not cite or verify its sources or references, and may therefore be used to manipulate, distort, or hide information. For example, ChatGPT may provide a one-sided account of the causes or consequences of an event in history lessons.

> *It should not be forgotten that ChatGPT is a machine that ignores people's feelings, culture, or values. You may think I'm exaggerating. I think it is a very suitable field for those who want to misuse information in some form of threat.* (P3)

Legitimizing plagiarism: Four of the participants pointed out that AI applications lead students to plagiarize or cheat in their assignments. It may provide students with ready-made content and prevent them from producing their own original work. ChatGPT may make it unnecessary for students to cite, quote, or attribute the sources they use.

> *It is a modern form of cheating that is widely used in online exams...* (P10)
>
> *I feel that ChatGPT makes it easier for students to plagiarize. Instead of expressing their own ideas, they prefer to quickly get ready-made answers.* (P7)

Privacy and security: All of the participants, except for one, talked about the privacy and security issues linked to ChatGPT. It was suggested that ChatGPT may collect, store, or share students' personal information, thereby violating their privacy or compromising their digital or even physical safety. ChatGPT could be used to misuse, leak, or steal students' information.

> *While using ChatGPT, I often find myself worrying about how my information is being protected and the potential security risks involved* (P6)

Discrimination and prejudice: The participants suggested that the content of AI-generated information is sometimes discriminative and biased. It has the potential to discriminate against people based on their gender, race, ethnicity, religion, or age.

> *ChatGPT and similar AI systems can sometimes create discrimination and bias. Their responses may include negative judgments about certain groups. This poses a significant issue for teachers because education should provide equal opportunities for everyone. It's crucial not to overlook these biases in education to ensure a fair learning environment.* (P5)

Virtual addiction: The participants highlighted that ChatGPT may cause students to become addicted to a virtual world, leading them to disconnect from reality and the real world. They suggested that it could negatively affect students' social skills, physical health, or mental state.

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For the moment, I believe that the rate of use among students is low. But it will increase over time and ChatGPT will become addictive. I think this addiction will affect the quality of many relationships at school. (P19)

4. Discussion

With the emergence of artificial intelligence technologies and ChatGPT in particular, discussions about the potential benefits and risks from using AI have become ubiquitous. However, we realized that studies on the impact of these technologies in education have been somewhat limited. In this context, we believe that revealing educators' perspectives on this issue will help contribute to expanding these discussions and collective understanding. In this study, we investigated the strengths, weaknesses, opportunities, and threats arising from the use of ChatGPT in the context of K-12 education based on educators' real-life experiences. In total, four school principals and 17 teachers from K-12 schools in Turkey participated in the study.

One of the biggest advantages of using ChatGPT in education is the personalized learning through the provision of support to individuals at different levels. Farrokhnia et al. (2023) stated that ChatGPT's ability to maintain the context of the question in its answers improves personalized learning. In addition, the current study revealed that receiving rapid feedback encourages users to ask more questions, thereby increasing independent learning opportunities. This feature of ChatGPT is important because when it comes to learning certain topics, consulting an expert may not always be easy or may require too much effort. However, ChatGPT's ability to provide feedback to its users with rational and appropriate responses through natural language processing technology (Singh & Singh, 2023) has allowed teachers and school principals to improve their professional capacity while saving time.

Our analysis showed evidence that the capability of ChatGPT to provide 24x7 feedback to educational practitioners was considered as being of importance to teachers. This feedback allows teachers and students to improve their text-writing skills in alignment with their own learning pace and needs (Alabool, 2023). In addition, our research findings suggest that ChatGPT's features such as language skills and content richness can help students to produce texts in different languages and in varying subject areas. This can save teachers considerable amounts of time, allowing them to devote themselves more to interacting directly with their students. AI also provides teachers with significant convenience in terms of lesson planning, content and activity preparation, as well as in generating exam and test questions. AI can support collaborative learning in the classroom, enabling educators to produce and share texts in group-based activities. ChatGPT affords teachers greater opportunity for interaction and collaboration.

Regarding the weaknesses of using ChatGPT in education, the main problem were based around ethical issues. For example, answers given by ChatGPT cannot be audited as accountability cannot be warranted for the responses given by AI tools (Ouyang et al., 2022). The issue of misinformation, which is a common weakness associated with the use of ChatGPT, also appears as a significant problem facing today's K-12 schools. ChatGPTdoes not have up-to-date information about world events taking place after 2021 (Stokel-Walker & Van Noorden, 2023). As information is constantly changing, this limitation can sometimes lead to outdated or incorrect answers. For example, when up-to-date references are required, ChatGPT may produce references that appear random but are not based on real sources (Choi et al., 2023). The use of ChatGPT carries certain risks as well as offering potential benefits. In addition, these technologies raise several ethical, legal, and pedagogical issues. Therefore, it is recommended that such AI tools are used with a degree of caution (İpek et al., 2023; Karaköse, 2023, 2024; Karaköse & Tülübaş, 2023, 2024; Nguyen et al., 2024; Ramirez & Fuentes Esparrell, 2024; Tülübaş et al., 2023). Teachers can sometimes tolerate AI providing academic information that is not based on real sources, but for students to gain an objective perspective, AI must provide sensitive, balanced, and accurate information on complex and sensitive issues such as

human rights, the environment, social justice, and equality. In addition, artificial intelligence tools cannot fully meet the emotional, social, and cognitive needs of students due to the lack of intuition and common sense in their responses (Wake et al., 2023). This, in turn, may negatively affect students' motivation for the teaching and learning activities.

Opportunities created by ChatGPT in education include personalized learning environments designed based on individual learning needs. The fact that ChatGPT has an artificial intelligence-based text generation system and its ability to learn from users' interactions makes it a personalized conversational tool (Kalla & Smith, 2023). Since ChatGPT trains on large amounts of data, it has the potential to provide personalized responses (Rathore, 2023). This feature is also important since it shows that as teachers interact with ChatGPT, artificial intelligence produces more personal responses and creates unique texts in dialogue with the user (Aljanabi, 2023). Based on their personal experiences, the participant teachers and school principals indicated that in their interactions with ChatGPT within the scope of a personalized learning environment, students' learning motivation increased. Additionally, support can be provided based on students' preferred learning style and pace, with learning resources becoming more enriched, and the learning process becoming more enjoyable. This finding is based on AI's potential as a virtual tutor within a personalized learning process that communicates directly with students in a natural language, providing them with feedback and guidance as part of the learning process; thereby enabling them to more easily access appropriate learning resources (Opara et al., 2023).

The threats posed by ChatGPT in education, according to the study's participants, were privacy and security issues, decreased levels of teacher-student interaction, risks associated with virtual addiction, and the artificialization of information. Many concerns were expressed about cheating in online exams through the use of AI tools such as ChatGPT (Garg & Goel, 2022); potentially jeopardizing the reliability of online exams (Susnjak, 2022). It has also been shown that ChatGPT can provide accurate and appropriate answers to exam questions in fields such as medicine (Kung et al., 2023) and law (Choi et al., 2023). These findings indicate that the conventional examination system will soon need to be revised in order to address the potential of students cheating with AI. Another threat concerning the use of ChatGPT in education is that its usage may trigger social problems such as artificiality and virtual addiction. It was stated in the participant interviews that the continuous use of ChatGPT could result in students losing their ability to communicate effectively with real people or to become overly dependent on ChatGPT in their education.

5.1. Limitations and suggestions for future research

Several limitations should be considered in terms of how the findings of the current study are evaluated. First, ChatGPT has not yet become that widely used among educational practitioners since it was first launched in late 2022. Therefore, the results of the current study may not cover the full potential of AI's usage in education. For example, although evidence of using ChatGPT for different purposes across various subject matter courses was highlighted in the findings, the study did not sample teachers that covered all subject areas taught in today's schools. Therefore, we recommend that researchers replicate the current study with a maximum variety sampling strategy.

Second, research on subject-specific investigation of ChatGPT was also limited in this study, with that research gap not covered due to the lack of a relevant sample. Future research, therefore, could focus on a single subject area to explore in greater detail how teachers can best integrate AI into subject-specific courses. Finally, the purpose of the current research was fairly generalized, with the primary aim being to learn about teachers' and school principals' perceptions of using ChatGPT in K-12 education. However, an independent study focusing only on school principals could investigate the extent to which and how they utilize AI tools to manage and lead their schools, which could provide important implications for school leadership.

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5. Conclusions

The current study contributes to the literature by addressing the role of ChatGPT in K-12 education based on a comprehensive SWOT analysis. Unlike previous studies, the current study revealed empirical evidence of both the positive and negative aspects of AI's use in the teaching and learning processes of K-12 education. Distinguishing itself from other recent studies (Farrokhnia et al., 2023; Singh & Singh, 2023), the current study examined in depth both the potential benefits of using ChatGPT and its limitations. As such, the study offers the literature a new and critical perspective on the use of artificial intelligence in the classroom, and provides a solid foundation for future research in this area.

Our research has shown that ChatGPT can make significant contributions to educational processes when used strategically by teachers and school principals at the K-12 level. Especially in the context of language teaching, the writing and speaking practice opportunities afforded by ChatGPT to teachers has the potential to facilitate student learning. When teachers make use of ChatGPT's rapid feedback structure in quizzes and assessment processes, they contribute to the acceleration of their students' learning due to the instant feedback that ChatGPT provides to students. Therefore, teachers can make use of ChatGPT to diversify their teaching strategies not only in language teaching, but also in a variety of theoretical courses. Various teaching strategies such as discussion and brainstorming could help to increase students' interest in lessons with the support of AI tools and thereby contribute to the deepening of classroom interactions. Using ChatGPT as a virtual assistant can help facilitate student guidance through the provision of instant feedback, enabling the development of more student-centered learning environments.

However, we recommend that the use of ChatGPT in classrooms needs to meet certain ethical considerations. The risk that the use of AI tools could offer out-of-context, false, or misleading information to students should be carefully addressed. However, we believe such ethical challenges can be mitigated through the comprehensive training of both teachers and students, and that the careful use of AI can be an effective additional tool in modern-day teaching processes. In conclusion, our study suggests that ChatGPT can be utilized as an innovative tool in pedagogical processes, and that it can help to increase the quality of teaching and learning when managed correctly. Integrating AI into teaching processes can offer new learning opportunities for teachers and pave the way for the development of innovative approaches in education.

Declarations

Author Contributions. M.T.: Original draft, conceptualization, data curation, data analysis, visualization, discussion, conclusion, M.Ş.B.: Draft review/editing, conceptualization, supervision, conclusion. M.Ö.: Methodology, data analysis, discussion. All authors have read and approved the published final version of the article.

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