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## SWOT Analysis of the Use of ChatGPT in Education

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### ABSTRACT

In recent years, artificial intelligence technologies that take on human abilities or jobs have become a significant issue. ChatGPT, a chatbot developed by the OpenAI artificial intelligence company, has been one of the most important developments in this field. Educational environments directly affected by these technological developments have gained a new dimension. The introduction of artificial intelligence technologies into the service of the whole world and their use in the educational environment has made it necessary to examine the strengths and weaknesses of the current situation, the opportunities it offers and, threats it creates. The aim of this research is to examine the use of ChatGPT in education using SWOT analysis. A qualitative research method was used to reveal the thoughts of the participants regarding the use of ChatGPT in education. The study group is composed of educators who use GPT in educational environments. The data was obtained with the semi-structured interview technique to be used as a data collection tool. The data were analyzed by content analysis. Within the scope of the research, the perspectives of the participants on the strengths and weaknesses, opportunities, and threats of the use of GPT in education are presented in written and visual form.

**Keywords:** Artificial Intelligence, ChatGPT, Education, SWOT Analysis.



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## Introduction

Artificial intelligence developments continue to constitute an important area of study on this subject. Artificial intelligence (AI) can be defined as the field that focuses on the programming of so-called intelligent machines that resemble human intelligence at a certain level and can provide the same responses (Verma, 2018). McCarthy et al. (2006), who first used the term AI, based on the assumption that learning can be defined by any aspect and feature of intelligence and that a machine can be built to imitate it. Based on the definitions in the literature, Popenici and Kerr (2017) defined AI as a computer system that can perform human operations, such as learning, adaptation, synthesis, self-correction, and providing information for complex tasks. Artificial intelligence programs called chatbots imitate human-user communications (Johari et al., 2019). Chatbots enable user interaction through text and speech (Meço & Çoştu, 2022). To understand and respond to customer requests, companies make use of technologies like Natural Language Processing (NLP) (Daniel et al., 2020; Ghaleb et al., 2022). The capability of chatbots to interact with users in a human-like manner while offering guidance, help, and even educational support is one of their most important features (Abdulkader & Al-Irhayim, 2022; Liu, 2024; Pérez et al., 2020). Additionally, they have been applied in educational contexts to improve student learning outcomes and offer individualized support (Liu, 2024; Pérez et al., 2020). ChatGPT, a chatbot application, is a chatbot based on the GPT-3 language model developed by OpenAI. It has been stated that ChatGPT applications process information accurately, efficiently, systematically, and informatively, representing the most advanced level of artificial intelligence and driving educational reform (Zhai, 2022).

It has been stated that artificial intelligence, which is effective in many areas of life, has also affected the field of education (Alanoğlu & Karabatak, 2021) and will continue to transform education (Sadiku et al., 2021). The requirement for specific learning experiences to meet the needs and learning preferences of each individual student is one of the major challenges facing education today. To develop individualized learning methods for students that adjust to their pace and preferences, artificial intelligence (AI) analyzes enormous volumes of data (Abuhassna, 2024; Sadiku et al., 2021). Better learning results are eventually the result of this personalization, which also increases student motivation and engagement. Another challenge in education is the assessment process. AI proves its usefulness in providing personalized feedback and evaluating performance using quantitative and qualitative information (Samarakou et al., 2016). It offers innovative assessment methodologies that can provide real-time feedback, track student performance, and offer insights into areas where students may need additional support (Calatayud et al., 2021).

With the development of systems based on artificial intelligence, the types of people to be trained and, the structure and functioning of education have changed. In particular, after the pandemic period, it is predicted that there will be an increase in studies in the field of artificial intelligence and

that this will be a solution to possible educational problems (Coşkun & Gülleroğlu, 2021). When the literature is examined, studies on the use of AI in education (Akgün & Greenhow, 2022; Alanoğlu & Karabatak, 2020; Akdeniz & Özdiç, 2021; Chen et al., 2020; Coşkun & Gülleroğlu, 2021; Deveci Topal et al, 2021; Frye, 2022; Fırat, 2023; Gürsakal et al., 2022; Güzey et al., 2022; İşler & Kılıç, 2021; Meço & Coştı, 2022; Ouyang & Jiao, 2021; Popenici & Kerr, 2017; Verma, 2018) support this. Among the studies, it has been observed that only the studies on ChatGPT, an artificial intelligence application, reveal its competence in the field of education and focus on ethics (Cotton et al., 2023; Karakoç-Keskin, 2023; Kızılgöçit et al., 2023; Tekin, 2021; Savelka et al., 2023; Susnjak, 2022; Zhai, 2022), and the opinions of students on its use in education are explored (Aktay et al., 2023).

Aktay et al. (2023) sought to reveal student views on the use of ChatGPT in education. As a result of the study, in which the study group consists of 15 students studying in the 4th grade, it has been stated that the students find the use of ChatGPT in education interesting and fun; that the inclusion of AI in teaching increases academic achievement and provides more information than traditional printed sources such as textbooks.

The study conducted by Cotton et al. (2023) with the contributions of ChatGPT aimed to investigate the opportunities and challenges, possible risks and gains of using ChatGPT at the university level. This study proposes strategies to enable universities to use AI in an ethical and responsible manner to address the challenges of detecting and preventing academic dishonesty. This study is meant to serve as a wake-up call for university staff to pay attention to ways to guide their evaluations and ensure that academic dishonesty is clearly explained to students and minimized.

Susnjak (2022) stated that his study, which evaluated ChatGPT' s ability to perform high-level cognitive tasks and produce text indistinguishable from human-generated text, raises concerns about the potential use of ChatGPT as a tool for academic misconduct in online exams. The study concluded that educators and institutions must carefully evaluate and investigate how ChatGPT can be used ethically and responsibly.

When studies on the use of ChatGPT in education through **SWOT (Strengths, Weaknesses, Opportunities, Threats)** analysis are generally evaluated, it has been stated that they are conducted through a literature review on a specific subject (Farrokhnia et al., 2023). In order to perform SWOT analysis in this study, the opinions of educators using ChatGPT in education are explored. **SWOT** analysis is the examination of an organization's strengths and weaknesses, opportunities for growth and development, and external threats. **SWOT** analysis consists of collecting and evaluating important data, categorizing the collected data into four categories: strengths, weaknesses, opportunities and threats, developing a **SWOT** matrix, and incorporating **SWOT** analysis into the decision-making process

(Gretzky, 2010). An organization, strategy, project, or business activity can be evaluated using **SWOT** analysis. Therefore, **SWOT** analysis is crucial for assessing an organization's strengths, weaknesses, opportunities, and threats. Opportunities and strengths are useful in achieving organizational goals. Threats and weaknesses are detrimental to achieving corporate goals (Gürel & Tat, 2017). As a technique commonly used in commercial evaluations, **SWOT** analysis has also been applied in educational studies (Akçöltekin et al., 2022; Çelikoğlu et al., 2023; Emek, 2021; Ezin, 2021; Kılıçoğlu & Aydemir, 2022; Leontyeva et al., 2019; Pilar et al., 2015; Tekin & Yalpar-Yelken, 2022; Yelken et al., 2012).

As a result of the development of systems based on artificial intelligence, educational goals and situations have changed. Educators are the most important group that needs to adapt to developments (Çoşkun & Gülleroğlu, 2022). It is inevitable for educators, who are the natural implementers of programs, to use AI applications in educational environments. For this reason, it is thought that taking the opinions of educators about the strengths and weaknesses, opportunities and, threats related to the use of ChatGPT in education, which is an artificial intelligence application, and addressing them in line with **SWOT** analysis will contribute to the literature. In this study, it is aimed to determine the current state of the use of ChatGPT in education using **SWOT** analysis method. For this purpose, the following subproblems were identified:

1. According to educators' opinions, what are the strengths of using ChatGPT in education?
2. According to the opinions of educators, what are the weaknesses of using ChatGPT in education?
3. What are the opportunities of using ChatGPT in education according to educators' opinions?
4. What are the threats to using ChatGPT in education according to educators' opinions?

### ***Research Objective***

This study aims to examine the use of ChatGPT in education through SWOT analysis based on educators' opinions. Thus, by determining the strengths and weaknesses of the method, it will be possible to have an idea about how and in which areas the strengths can be used, weaknesses can be strengthened, possible opportunities can be evaluated in the most efficient way, and measures can be taken against possible threats. ChatGPT was analyzed in line with the SWOT analysis by consulting the opinions of educators.

## Methods and Materials

### *Research Model*

This study employs a basic qualitative research design. Researchers may not always conduct phenomenological, theory-building, discourse analysis, or ethnographic studies. Instead, a researcher can conduct qualitative research with an interpretive approach (Merriam, 2009 as cited in Tekin & Yanpar- Yelken, 2022). In this study, the basic qualitative research design was used to examine educators' views on the strengths, weaknesses, opportunities and threats of using ChatGPT in education through SWOT analysis.

### *Data Collection*

A survey form was used to collect data for the study. The survey form was prepared based on the related literature. The survey form developed by the researcher was shaped into four themes under the titles of "Strengths of using ChatGPT in education", "Weaknesses of using ChatGPT in education", "Opportunities provided by using ChatGPT in education" and "Threats of using ChatGPT in education" and consisted of a total of 4 structured open-ended questions under these titles. The validity study was conducted by consulting an expert who is a lecturer at the Department of Curriculum and Instruction. Data were collected via email between January 15 and February 1, 2024.

### *Data Analysis*

The author carefully reviewed the survey forms. Then, the data were categorized into four SWOT domains: strengths, weaknesses, opportunities, and threats. The MAXQDA 2018 software was used to process the data. The program was then used to enter survey transcriptions. The data obtained through the data collection tool were subjected to content analysis. The content analysis process includes the following steps: constructing themes for analysis, developing a codebook, selecting the content to be analyzed, coding the content, conducting the analysis, and reporting the findings. By examining the data, the codes were developed. Codes indicating how frequently the study variables occurred are shown. In addition, this information was supported by direct quotations. Literature review conducted to assess the study validity and reliability. The research design, study group, data collection tool and data analysis were explained in detail. The fact that the researcher of the study and the data can be accessed upon request is important in terms of ensuring the external reliability of the study.

## Sampling

The study group was selected according to purposive sampling, which is a non-probability sampling method. This study is composed of the participants (n = 15) who are educators using ChatGPT

in education. To enhance the understanding of the questions asked, a purposive sampling technique was employed, with participants being invited from individual interviews via email because they satisfied at least two of the following conditions: 1) teachers working at any primary/secondary/high school or university, 2) they use ChatGPT in any course during teaching 3) have academic studies on using ChatGPT in education. The demographic information about the participants is presented in Table 1.

*Table 1. Demographic characteristics of the participants*

Participants	Country	Field of study
E1	Türkiye	Education
E2	China	Medicine
E3	Türkiye	Education
E4	Türkiye	Education
E5	The USA	Tourism
E6	The USA	Education
E7	The USA	Education
E8	The USA	Education
E9	Türkiye	Education
E10	Türkiye	Education
E11	The USA	Education
E12	The USA	Education
E13	The USA	Education
E14	The USA	Education
E15	The USA	Education

## Ethical Considerations

All the rules stated in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed in the entire process from planning, implementation, data collection to the data analysis. None of the actions specified in the second section of the Directive, "Scientific Research and Publication Ethics Actions" have been carried out.

During the writing process of this study, scientific, ethical and citation rules were followed; no falsification was made on the collected data. For qualitative data, the participants were informed that there was no obligation if they decided to opt-out at any time.

Ethical review board name: Scientific Research and Publication Ethics Committee of Necmettin Erbakan University

Date of ethics review decision: 05/01/2024

Ethics assessment document issue number: 2024/12



## Results

In this section, the findings are presented in line with the scope of the research.

### 3. 1. Opinions on the Strengths of Using ChatGPT in Education

In SWOT analysis, strengths are the aspects that make the method more effective than other methods. According to the opinions of the educators, their views on the strengths of using ChatGPT in education were categorized and frequency values are shown in Table 2:

*Table 2. Strengths of using ChatGPT in education according to educators' views*

Strengths	<i>f</i>
Providing personalized learning	11
Giving instant feedback	11
Caring for individual differences	6
A wealth of knowledge	2
Developing students' creativity	1

According to the opinions of the educators, common categories were determined in line with their views on the strengths of using ChatGPT in education, and 5 common categories and their frequency values are presented in Table 2. According to Table 2, when we look at the opinions of educators regarding the strengths of using ChatGPT in education, it is seen that the categories of providing personalized learning ( $f=11$ ), giving instant feedback ( $f=11$ ), caring for individual differences ( $f=6$ ), wealth of knowledge ( $f=2$ ) and developing students' creativity ( $f=1$ ) were reported. Sample statements from educators' opinions are as follows:

*E1: "From my own short experience with GPT I found that it can provide my students with personalized learning and feedback through adapting to each student's needs... Another positive use of GPT is enabling my students to get instant feedback and answers to their questions, instead of waiting for teacher availability."*

*E8: "GPT can provide personalized learning experiences, instant feedback, and a wealth of knowledge"*

*E12: "Personalized learning: GPT can be used to create personalized learning experiences for each student, tailored to their individual needs and interests."*

*E14: "GPT can be used to help students develop their creativity and communication skills by providing them with tools for generating text, translating languages, and creating different types of content."*

### 3. 2. Opinions on Weaknesses in Using ChatGPT in Education

In SWOT analysis, weaknesses are the factors that create obstacles to the use of ChatGPT in education. According to the opinions of the educators, the views they expressed about the weaknesses of using ChatGPT in education were categorized and frequency values are shown in Table 3.



**Table 3.** Weaknesses in using ChatGPT in education according to educators' views

Weakness	<i>f</i>
Reliability of the product	13
Corrupting social interactions	7
Undermining students' thinking skills	5
Ready-made information	2
Generating biased outputs	2
Security and privacy problems	2

Common categories were determined in line with the opinions of educators regarding the weaknesses of using ChatGPT in education, and the 6 common categories and their frequency values are shown in Table 3. According to Table 3, product reliability ( $f=13$ ) is the most common category. The other categories include corrupting social interaction ( $f=7$ ), undermining students' thinking skills ( $f=5$ ), using ready-made information ( $f=2$ ), generating biased outputs ( $f=2$ ), security and privacy problems ( $f=2$ ). Below are examples of educator opinions on the weaknesses of using ChatGPT in education:

*E7: "Another weakness is that overdependence on GPT can undermine students' critical thinking and knowledge retention. If students become reliant on simplistic GPT explanations, they may not learn to solve challenging problems or draw connections between concepts."*

*E9: "GPT is not perfect and may produce texts that are inaccurate, irrelevant, or plagiarized from existing sources"*

*E10: "GPT may also lack the human touch and empathy that are essential for effective teaching and learning"*

*E11: "Bias: GPT is trained on a massive dataset of text and code, which may contain biases. This can lead to GPT generating biased outputs."*

*E13: "Accuracy: GPT is still under development, and its outputs can sometimes be inaccurate or misleading."*

### 3. 3. Opinions on Opportunities Provided by the use of ChatGPT in Education

In SWOT analysis, opportunities are those that increase the effect of the elements that make the application effective and reduce the effect of weaknesses. According to the opinions of educators, opportunities provided using ChatGPT in education are categorized and, frequency values are shown in Table 4.

**Table 4.** Opportunities provided using ChatGPT in education to educators' views

Opportunities	<i>f</i>
Saving time	10
Accessibility	10
Providing an interactive learning	7
Fostering innovation and collaboration	2
Providing convenience in programing	1

Common categories were determined in line with the opinions expressed by educators regarding the opportunities offered using ChatGPT in education, and the 5 common categories and their frequency values are shown in Table 4. According to Table 4, it can be seen that they expressed their opinions in the categories of saving time ( $f=10$ ), accessibility ( $f=10$ ), providing an interactive learning environment ( $f=7$ ), fostering innovation and collaboration ( $f=2$ ) and providing convenience in programing ( $f=1$ ). Examples of educators' views on the opportunities provided by the use of ChatGPT in education are as follows:

*E1: "There are many opportunities in using GPT for students, such as the ability to make learning more engaging and interactive through developing fun natural interaction, and to create conversations that feel rewarding and human-like. Additionally, the new GPT can improve accessibility and inclusion for more students with diverse needs."*

*E8: "GPT can also enable more inclusive and diverse education, where learners can interact with texts in different languages, cultures, and perspectives"*

*E9: "GPT can offer new possibilities for open education, where learners can access high-quality content and support from anywhere and anytime"*

*E12: "GPT can also foster innovation and collaboration, where learners can co-create texts with the AI and share them with others."*

### 3. 4. Opinions on Threatening Aspects of ChatGPT Use in Education

In SWOT analysis, threats are elements that the application directly or indirectly affects negatively. According to the opinions of educators, their views on the threatening elements of ChatGPT use were categorized and frequency values are shown in Table 5.

*Table 5. Threatening aspects of ChatGPT use in education*

Threats	<i>f</i>
Plagiarism	13
Students' dependency on ChatGPT use	7
Job displacement	6
Digital divide	3
In-app advertisements	1

Common categories were determined in line with the opinions of educators regarding the threats posed by the use of ChatGPT in education, and the 5 categories and their frequency values are shown in Table 5. According to Table 5, it can be seen that the respondents expressed opinions in the categories of plagiarism ( $f=13$ ), students' dependency on the use of ChatGPT ( $f=7$ ), job displacement ( $f=6$ ), digital divide ( $f=3$ ), and in-app advertisements ( $f=1$ ). Sample statements from educators' opinions are as follows:

*E1: "Some of the ethical issues include issues relating to protecting users' privacy and data, possibility of bias and discrimination of the GPT against the users, the intellectual property of the work produced, the level of reliability of the texts developed by the GPT, and the issue of reliance of users on GPT to create work. The social issues include the absence of the human element in their communications with*

*the GPT, affordability, equal access to AI language models for all students, and the lack of inclusivity and equity of AI language models like GPT.”*

*E2: “GPT may undermine the role and value of human teachers and educators, who may feel threatened or replaced by the AI”*

*E4: “GPT may also create a digital divide, where learners who have access to the AI have an unfair advantage over those who do not”*

*E6: “People’s thoughts can be manipulated too much, ChatGPT in-between advertising practices can be harmful”*

*E14: “Academic dishonesty: GPT can be used to plagiarize and cheat on assignments, which could erode academic standards.”*

*E15: “Job displacement: As GPT-powered tools become more sophisticated, they could displace human teachers and other education professionals.”*

## **Discussion and Conclusion**

According to the opinions of the educators, among the opinions put forward regarding the strengths of using ChatGPT in education, the most common view was that it enables individualized teaching, and individual differences were considered. The result of this research coincides with the result of the research conducted by Agustini (2023). The study concluded that ChatGPT can provide immediate feedback, self-reflection and self-assessment, language practice and help students gain confidence and skills to become self-directed learners. Ekoç- Özçelik& Elgün- Gündüz (2023) stated that ChatGPT is a useful educational tool because it allows students to receive immediate feedback on their work and enhances their comprehension of the material. The results of this study align with the conclusions presented in other articles addressing the strengths associated with ChatGPT (Farrokhnia et al., 2023; Karaköse & Tülübaş, 2023; Lee et al., 2024; Mhlanga, 2023; Park, 2023, Prasetya & Sharif, 2023, Satir&Korucu, 2023).

According to educators' views, the weaknesses of using ChatGPT in education are the weakening of social interaction and the reliability of the products developed by ChatGPT. Leleparady (2022) stated that ChatGPT is a computer-controlled tool that provides contextual and consistent responses, and the absence of social interaction, which requires direct interaction with native speakers or experienced teachers supports the views on the weaknesses of the study. In his literature review, Sallam (2023) concluded that the information produced by ChatGPT is not scientifically accurate and does not have a reliable content. Elkhatat (2023) stated that data for versions 3.5 and 4.0 that are valid until September 2021 limit the restricted knowledge base of GhatGPT, which is currently offline. Another weakness of using ChatGPT is that it dulls the thinking skills. Kasneci et al. (2023) stated that students can use ChatGPT too much and that the information produced without effort can negatively affect critical thinking and problem-solving skills. The results of these studies are similar to those of the current study.

According to the opinions of educators, providing an interactive learning environment, saving time, easy access and ease in programing are the opinions they put forward regarding the opportunities

of using ChatGPT in education. The research findings of this study on opportunities are supported by the literature on ChatGPT in the field of education (Farrokhnia et al., 2023; Frye, 2022; Pavlik, 2023; Zhai, 2022). It is possible to see the perspective presented by Adeyato (2023). It has been stated in his study that the use of ChatGPT while having access to a greater range of information that is targeted to their interests saves time and facilitates communication similar to human speech.

According to the opinions of educators, threats of ChatGPT use in education include students' addiction to using the application, plagiarism, unemployment, the digital divide, in-app advertisements. Similarly, Savelka et al. (2023) and Zhai (2022) stated that it is inevitable for students to use ChatGPT to complete their homework. It has been stated that most ChatGPT users are students (Leleparady, 2022). Susnjak (2022) stated that the use of ChatGPT poses a threat to the reliability of university-level online exams. As in the current study, Watters and Lemanski (2023) emphasized that the negative view of the ChatGPT literature stems from ethical concerns. Rudolph et al. (2023) highlighted the use of ChatGPT in terms of plagiarism in learning, teaching and assessment processes in higher education. Cotton et al. (2023) stated that ChatGPT raises concerns about academic honesty and plagiarism. In the study conducted by Karakoç- Keskin (2023), the theme of plagiarism was addressed within the scope of the concerns included in the ChatGPT agenda in Turkey. In this study, it has been stated that the use of ChatGPT in homework and projects by students in education and its utilization in online exams has been expressed as a concern for education professionals. In the present study, the emphasis on plagiarism was in line with the results of previous studies. In addition, in this study, it has been stated that one of the concerns raised about using ChatGPT in business life is the fear that unemployment will increase. Lock (2022) stated that early users of ChatGPT predicted that it would eventually replace occupations in a variety of content creation fields, including those held by programmers, teachers, playwrights, and journalists. These results support the theme of threats posed by ChatGPT in the recent study.

### **Limitations and Recommendations**

In line with the findings obtained within the scope of the research, the following suggestions can be made:

- Studies should be conducted in which the use of artificial intelligence applications in education is evaluated using different techniques including detailed analysis such as SWOT analysis.

- The weaknesses and threats can be considered in the process of using ChatGPT in education and measures can be taken. It is important to educate educators and students about the potential risks and limitations associated with ChatGPT. Legal and ethical compliance with ChatGPT can be maintained by establishing ethical criteria for its proper use. To effectively control ChatGPT use,

institutions should consider adding usage rules to their learning environments. Stressing ChatGPT's additional role as a tool rather than an alternative to traditional teaching techniques is crucial.

- Researchers who will conduct studies on this subject can be recommended to conduct studies with larger samples and groups in which all stakeholders, such as teachers, students, administrators and parents are considered.

- SWOT analysis can be applied to stakeholders at certain intervals to contribute to taking practices and measures that will increase the utilization of AI developments in education, and the results can be used in development and improvement studies.

### Authorship contribution statement

**Fatmanur Budak Durmuş:** Writing – review & editing, Writing – original draft, Methodology.

### Declaration of competing interest

None.

### Data availability statement

The original contributions presented in the study are included in the article. Supplementary material, further inquiries can be directed to the author.

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