

Student Perceptions and Attitudes About the Usage of Chatgpt in Online K-12 Education and Student Preferences About Learning to Use Artificial Intelligence from Teachers

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Abstract This quantitative study investigates high school students' perceptions and attitudes towards the usage of ChatGPT and other GAI tools in online K-12 education, as well as students' preferences for learning to use Artificial Intelligence (AI) from teachers. Conducted at a large virtual school on the east coast of the USA, the research focuses attention on students in grades 9-12 enrolled in Math courses. The study utilized a 9-item survey to gather data on students' frequency of AI usage, attitudes towards AI, and student interest in receiving instruction from teachers about AI use. Key findings reveal that while a majority of students do not regularly use AI tools for academic work, there is a significant interest in learning how to effectively utilize these tools. Student participants expressed mixed attitudes towards AI, with ethical issues, loss of critical thinking skills, and over-reliance of technology being the chief concerns. Despite these concerns, many students acknowledged the potential of AI in enhancing learning experiences and expressed a desire for more structured support from educators. The study highlights the need for clear policies and educational strategies to address the ethical implications and practical applications of AI in K-12 virtual education, fostering a balanced approach that enhances learning while mitigating potential drawbacks.

Keywords: K-12 Education, online learning, virtual education, AI tools, ChatGPT, Artificial Intelligence, AI in Education, critical thinking, AI integration, educational strategies, and student perceptions

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1. Introduction

K-12 education has undergone a transformative shift towards online platforms, necessitated by technological advancements and the global adoption of remote learning modalities, in part due to the Covid-19 pandemic when many students transitioned from in-person education models to online learning [1,2]. This shift has prompted educators to explore innovative tools, including artificial intelligence (AI), to enhance the quality and efficiency of the learning experience [3].

Among these Artificial Intelligence (AI) tools, ChatGPT has gained prominence for its natural language aptitudes and potential applications in academic settings. ChatGPT is a large language model that is trained using billions of words, internet data, and scanned books [4]. Some scholars warn against the use of AI tools like ChatGPT, citing biases, poor pedagogy, teacher disempowerment, and commercial exploitation as key

risks [5]. However, research by Hadi Mogavi et al. [6] suggest that AI tools like ChatGPT are beneficial to education in that the tool enhances productivity, efficiency, and can boost student confidence.

Disadvantages of students using AI tools like ChatGPT certainly exist. Abdelghani et al. [7] discovered that students could become overly reliant on AI tools and dependent, leading to minimal effort in problem solving and information seeking. Additionally, answers provided by AI tools like ChatGPT are confident but sometimes incorrect, causing students to overestimate their knowledge and accept information without critical analysis [7]. Other researchers found disadvantages of student reliance of AI tools. A study by Zastudil et al. [8] discovered that students lose deep learning, critical-thinking and problem-solving skills, and creativity when they over-rely on AI tools.

Despite the growing integration of AI in education, there was a noticeable gap in understanding how high school students, particularly those enrolled in fully remote, online K-12 schools, engage with and perceive AI tools

like ChatGPT. As technology becomes an integral part of the educational community, it is imperative to assess students' attitudes toward AI, the contexts in which students incorporate such tools into their academic work, and students' openness to guidance from educators in utilizing AI effectively.

This study sought to address this critical gap by delving into the multifaceted aspects of high school students' experiences with AI in the online learning environment. The exploration of students' perspectives, concerns, and receptiveness to guidance aimed to contribute valuable insights for educators, curriculum developers, and stakeholders as they navigate the dynamic intersection of AI and K-12 online education. Understanding these dynamics is foundational for fostering a learning environment that optimally integrates technological advancements to support and enhance students' academic endeavors.

2. Related Literature

The purpose of this quantitative study was to investigate the attitudes of high school students enrolled in a fully online K-12 school regarding the utilization of AI models, such as ChatGPT, for academic tasks. The study aimed to explore the frequency and contexts in which students engaged with AI models and discover high school students' perceptions of the advantages associated with using AI on schoolwork and whether students were receptive to teacher guidance on integrating AI into academic work. Artificial Intelligence has been used in education for many years in various forms [9]. In recent years, AI has taken a prominent role worldwide. OpenAI launched the public version of ChatGPT in 2022, providing users with an intelligent chatting robot that demonstrates strong language understanding and the ability to generate a multitude of products at a user's request [10]. As the integration of AI in education evolves, understanding students' attitudes toward AI models like ChatGPT becomes increasingly crucial. This study contributes to the current knowledge by examining high school students in a fully online K-12 setting, shedding light on the frequency and contexts of their AI engagement.

2.1. Student Attitudes, Perceptions, and Usage of AI in Education

Since ChatGPT came online and available to the public in 2022, researchers have been interested in the impact Artificial Intelligence will have on education [10,11,12,13,14]. College students at the UK's Open University were surveyed about their perceptions about Artificial Intelligence in online learning platforms, and most students indicated that AI in education was overtly beneficial, noting that AI could enhance personalized learning and help to provide quick support to students [15]. It is important to note that Holms & Anastopoulou [15] also found that university students feared that AI could potentially replace teachers at some point. To that point, preliminary research by Kim et al. [16] found that students were comfortable interacting with an AI teaching assistant

but were only comfortable to the point in which the instructor and students were comfortable with AI technology and communicating with AI.

Researchers of Vietnamese university students found that students favored the use of ChatGPT because the platform was user-friendly (Ngo, 2023) [17]. Ngo [17] also found that students enjoyed ChatGPT's benefits, like timesaving, personalized tutoring, and enhanced learning. Furthermore, Ngo [17] discovered some drawbacks students had about the use of ChatGPT; among the drawbacks were the platform's challenges with producing consistently reliable information, language nuances, and mathematical expressions. Huang et al. [12] studied university students in China and uncovered that over-use of ChatGPT caused phenomena such as test anxiety and academic misconduct. However, the researchers found positive results from the study and reported that university students who frequently use ChatGPT could increase learning efficiency and could benefit from self-learning abilities [12].

Bitzenbaur [18] discovered that 12th-grade students in physics classes favored the use of ChatGPT in class, indicating that AI enhanced students' lives and made classwork more efficient. Students in the study indicated that AI should be a regular part of everyday life and were overall optimistic about the use and benefits of ChatGPT. Another study surveyed student participants at a university outside of the United States and students using the Technology Acceptance Model framework [19]. The researchers found that students overwhelmingly favored ChatGPT because the language model could enhance students' educational experiences.

While Yilmaz et al. [19] did not indicate why students favored ChatGPT, another study which had a multi-national focus did describe why students preferred ChatGPT. Abdaljeel et al. [20] found that students preferred ChatGPT because of its ease-of-use functionality. The students in the study indicated that ChatGPT was accessible and could be used as a study assistant. In addition, Abdaljeel et al. [20] found that students perceived ChatGPT useful because it could be used as a personalized learning tool that helped non-native English speakers connect with educational content in a more meaningful way. The accuracy and speed of ChatGPT were also a benefit to students, allowing students to focus on what was most important during study times.

2.2. Education and Ethics

Much of the research about AI usage in the classroom discusses both benefits and drawbacks. AI models like ChatGPT have both intrigued educators and set them aflame with fear since its genesis [4,21]. However, the advent of AI in education has raised concerns about the ethics of AI usage in the classroom alongside the possibility of promising applications related to personalized learning and assessment [3]. Akgun & Greenbow [3] posited a chief concern about the use of AI in K-12 education, that concern being the matter of privacy. AI collects data, sometimes sensitive data, and students or educators could potentially give away private data with the use of AI. AI systems ask for users' consent to access their personal data, but many users give their

consent without knowing the extent of the information they are sharing [3].

Hadi Mogavi et al. [6] also found privacy to be a challenge with the usage of AI but highlighted three additional areas of concern regarding the use of AI in K-12 education: academic dishonesty, fraud, and misinformation. Naming academic integrity as the main concern, Hadi Mogavi et al. [6] pointed towards ChatGPT's powerful language functionality as a means for students to plagiarize and re-word existing writing content and language found on assessments; thus, potentially undermining educational efficacy. The researchers' concerns about misinformation and fraud were also of concern. ChatGPT can propagate misinformation and even fraud due to limitations found in data and user biases who input information into the algorithm. To bolster the point Hadi Mogavi et al. [6] made about academic integrity, researchers in Vietnam found that ChatGPT was able to successfully earn an average score on a standard cumulative high school exam, proving that ChatGPT could, indeed, pose issues concerning plagiarism and cheating among students [22].

Other researchers were concerned about the quality of information AI models like ChatGPT offer. ChatGPT and other AI models sometimes fabricate facts because the models cannot identify what information is relevant, and it is limited to the quality of information that is input into the algorithm; this leads to inaccurate information being presented to students [14]. Further research by Cano et al. [12] suggest that systemic biases exist in training data for ChatGPT. Cano et al. [12] further speculate that biases exist due to limited training data, come from skewed sources, and non-diverse perspectives.

Research by Chan & Tsi [23] acknowledged privacy and bias as potential drawbacks to using AI, but the researchers highlighted the risk and consequences of over-relying on AI as a shortcut. The researchers determined that over-reliance on AI could limit students' critical thinking, original idea creation, deeper learning of new material, and skill development. A study into perceptions of German high school students also cautioned against over-reliance on ChatGPT, suggesting that over-reliance on the tool could hinder critical thinking skills [18]. The over-reliance on AI was a concern for other researchers, but one particular drawback was that the use of AI could diminish the important relationship between the teacher and the student if the student did not need to consult a teacher since AI becomes, essentially, a virtual educational assistant for each student [24].

Ethical considerations surrounding the use of AI, like ChatGPT in K-12 education, have been mostly concerned with privacy. Other ethical concerns surrounding AI use in K-12 classrooms have focused on academic integrity since AI makes plagiarism and cheating easier. There are other ethical concerns about the proliferation of misinformation and fabrication of facts by AI systems like ChatGPT that lack proper contextual understanding of what is being produced. Finally, systemic biases in training data could lead to biased model outputs. While AI offered promising applications for personalized learning and assessment, researchers warned about over-reliance on AI limiting critical thinking and deeper skill development in students along with possibly diminishing the relationship between

teachers and students.

Integrating AI models, namely ChatGPT, into K-12 education is complex, exploring both advantages and drawbacks. Privacy emerged as a chief concern, with researchers highlighting potential data challenges and the inadvertent sharing of sensitive information by students and educators. Ethical considerations extended to academic integrity, as language capabilities of AI models like ChatGPT raised fears of plagiarism and fraud, as demonstrated in the research by successful outcomes on standardized exams. Concerns also center around the quality of information, as AI models may mistakenly fabricate facts due to limitations in data and biases in training models. While promising applications for personalized learning and assessment exist, researchers cautioned against over-reliance on AI, emphasizing its potential to hinder critical thinking, original idea generation, and deeper learning. The delicate balance between the benefits and ethical pitfalls of AI in education necessitates careful consideration.

3. Problem/Purpose Statement

In the context of the evolving online education landscape, students' assimilation of AI models, such as ChatGPT, into their schoolwork posed both opportunities and challenges [11]. Despite the increasing prevalence of AI tools in academic settings, there was a gap in understanding how high school students at fully remote, online K-12 schools, perceived and utilized AI for academic tasks. The absence of insights into students' attitudes, frequency of AI use, and openness to guidance from educators hindered the development of educated strategies for effective AI integration. This gap is concerning because it prevents informed decision-making, tailored educational strategies, and the enhancement of student engagement and learning outcomes. Additionally, it obstructs the delivery of appropriate professional development for educators and the encouragement of ethical and responsible AI use. This study addressed this gap by exploring high school students' perspectives about the use of AI like ChatGPT, how students use ChatGPT, and if students want teachers to incorporate how to use ChatGPT in lessons. The study aimed to provide valuable insights for educational stakeholders navigating the intersection of AI and online K-12 education. The purpose of this quantitative study was to investigate the attitudes of high school students enrolled in a fully online K-12 school regarding the utilization of AI models, such as ChatGPT, for academic tasks.

The research questions for this study are:

1: What are the attitudes of high school students at a fully remote, online K-12 school towards using AI models like ChatGPT for educational purposes?

2: How do high school students feel about receiving guidance from their teachers on effectively utilizing AI models like ChatGPT as tools to support their academic work?

Significance of the Study:

The study explores online high school students' perceptions and attitudes towards using ChatGPT and other AI tools in education. It finds that while students

show a strong interest in learning to use AI tools effectively, students also express concerns about ethical issues, potential loss of critical thinking skills, and over-reliance on technology. Conducted at a large public virtual school, the research underscores the importance creating clear policies and educational strategies to address the ethical implications and practical applications of AI, suggesting that structured support from educators could enhance learning experiences while mitigating potential drawbacks. This study is significant as it offers valuable insights for educators, curriculum developers, and stakeholders to navigate the integration of AI in K-12 education, fostering a balanced approach that optimally supports students' academic endeavors.

Limitations

The researchers acknowledge that certain limitations exist within the study. Due to the nature of student/teacher relationship and unfamiliarity with anonymous surveys, students may not feel comfortable being entirely honest about AI usage. Some participants may not have been aware of what Artificial Intelligence is or how to use it properly to form an opinion or perception about its usage. The researchers also realized that some participants may have been unable or had a challenging time thinking about other courses outside of math since the survey was sent to students from their math teachers.

4. Methodology

4.1. Design

A cross-sectional survey design was selected to explore high school students' perceptions of AI. The study consisted of an electronic survey designed to provide information that would generate a comprehensive understanding of students' AI usage and attitudes. This design was selected because it can yield a large sample size, is cost-effective and quick to administer, and avoids some of the ethical issues associated with other designs. The study was completed at a large K-12 virtual school on the east coast of the United States. The researcher focused the study on 752 high school students in grades 9-12 taking English courses and aimed to investigate high school students' perspectives on the usage of AI in online education.

4.2. Participants

The study was conducted in a large public virtual school in the United States. The survey was sent to

students and their parents or guardians using the school email system. To ensure the identity of the students was protected, an electronic consent form for parents and an electronic assent form for students were presented at the beginning of the survey. The survey was designed so that if either parental consent or student assent was not given, the survey could not be completed. The identification of students was kept private. Student identifiers, including student names, gender, and date of birth, were not recorded.

4.3. Materials

A 9-item close-ended survey instrument was created by the researcher. The survey consisted of the following item types: five Likert scale questions, one yes/no question, and three multiple-choice or multiple-response questions. The phrasing of the items and their corresponding response options are shown in the Results. The survey was created in Qualtrics, which is an online survey tool that allows researchers to distribute surveys and collect responses.

4.4. Procedure

Data analysis was restricted to students (a) whose parent or guardian provided consent, and (b) who provided their assent to participate in the study regardless of how many questions were answered. The survey data were exported from Qualtrics to SPSS 28 for statistical analysis. The analytic strategy included descriptive and inferential statistics such as frequency tables, chi-square tests of independence, and one-way ANOVA where appropriate. For chi-square tests, the p -value associated with Fisher's exact test [25] is reported in cases where at least one cell has an expected count of less than five responses.

5. Results

5.1. Descriptive Results

A total of 752 high school students agreed to participate in the study, and 661 (88%) answered all of the questions. Of the 661 respondents, 29.5% were freshmen, 28.4% were sophomores, 20.4% were juniors, 9.7% were seniors, and 12.0% indicated that their grade level was not listed. Students who did not respond to one or more questions were excluded from the calculation of the response percentages. Responses to the survey are summarized in Table 1.

Table 1. Frequency Table of Responses to Survey Items

Survey Item and Response Options	<i>n</i>	%
How often do you use artificial intelligence (AI) tools such as ChatGPT for your academic work?		
Never	356	53.9
Sometimes	255	38.6
About half the time	34	5.1
Most of the time	10	1.5
Always	6	0.9
In which school subject do you use AI tools like ChatGPT most frequently?		
Math	128	19.4

Science	21	3.2
English	91	13.8
History	43	6.5
Other	41	6.2
I don't use AI tools.	337	51.0
How would you describe your overall attitude towards using AI models like ChatGPT for educational purposes?		
Very negative	55	8.3
Negative	96	14.5
Neutral	314	47.5
Positive	119	18.0
Very positive	77	11.6
To what extent do you believe using AI models like ChatGPT enhances your learning experience?		
Strongly disagree	85	12.9
Somewhat disagree	92	13.9
Neither agree nor disagree	184	27.8
Somewhat agree	220	33.3
Strongly agree	85	12.9
Do you think using AI tools like ChatGPT is a form of cheating?		
Yes	242	36.6
No	189	28.6
Unsure	230	34.8
Would you be interested in receiving guidance from your teachers on how to effectively use AI tools like Chat GPT for your academic work?		
Definitely not	63	9.5
Probably not	117	17.7
Unsure	121	18.3
Probably	183	27.7
Definitely	177	26.8
How comfortable are you with the idea of your teachers incorporating AI tools into the curriculum?		
Extremely uncomfortable	48	7.3
Somewhat uncomfortable	67	10.1
Neither comfortable nor uncomfortable	176	26.6
Somewhat comfortable	211	31.9
Extremely comfortable	159	24.1
Which of the following BEST explains your concerns about using AI tools like ChatGPT for academic purposes?		
Concerns about loss of critical thinking skills	188	28.4
Uncertainty of AI's impact on creativity	55	8.3
Concerns about potential ethical issues related to AI use	69	10.4
Concerns about too much reliance on technology	168	25.4
Concerns about data privacy and security	40	6.1
I am not concerned.		
Which of the following suggestions do you believe would be MOST effective for teachers to integrate AI tools like ChatGPT into the learning experience?		
Providing step-by-step tutorials on AI tool usage.	143	22.2
Incorporating AI tools into specific lesson plans.	133	20.7
Offering workshops or training sessions for students on AI tools.	73	11.4
Collaborating with students to develop AI-based projects.	73	11.4
Encouraging peer-to-peer learning on AI technology.	31	4.8
Allowing flexibility for students to explore AI tools independently.	190	29.5

5.1.1. Frequency of AI Usage

As shown in Table 1, more than half of the students (54%) reported that they never use AI for their academic work. Only 2% of the students indicated that they use AI most of the time or always.

5.1.2. AI Usage by School Subjects

Among students who use AI tools for school, 37% indicated that they use these tools most frequently for math followed by subjects such as science and history

(30%). The remaining 26% used AI most frequently for English.

5.1.3. Attitudes Towards AI

Nearly half of the students (48%) reported having a neutral attitude regarding the use of AI for educational purposes. Approximately 30% of the students had a positive or very positive attitude, whereas 23% had a negative or very negative attitude.

5.1.4. AI for Enhancing Learning Experiences

Although most students indicated that they did not use AI tools for their academic work, 46% of students agreed that the use of AI tools enhances their learning experience. By contrast, 26% disagreed, and 28% neither agreed nor disagreed.

5.1.5. AI as a form of Cheating

There was little consensus among students about whether using AI tools is a form of cheating. Approximately 71% responded affirmatively or were unsure, whereas 29% indicated that they did not believe it was a form of cheating.

5.1.6. Interest in Receiving AI Guidance

Over half (55%) of the students indicated that they would “probably” or “definitely” like to receive guidance from their teachers on how to use AI tools for their work. Approximately 27% indicated that they would not like to receive guidance, and 18% were unsure.

5.1.7. Comfort with Teachers Incorporating AI

Over half of the students (56%) indicated that they were at least somewhat comfortable with their teachers incorporating AI tools into the curriculum. Only 17% expressed some level of discomfort.

5.1.8. Concerns about AI

Students were asked to indicate their primary concern about using AI for academic purposes. Although 21% of students were not concerned, 28% believed AI usage could result in a loss of critical thinking skills, and 25% believed AI usage could lead to excessive reliance on technology for academic purposes.

5.1.9. Suggestions for Teachers

When students were asked to indicate the most effective strategies for teachers to integrate AI tools, 30% expressed a desire for teachers to offer flexibility for students to explore AI tools independently. Only 11% were interested in participating in workshops or training sessions or collaborating with other students on AI projects. Very few students (5%) expressed an interest in peer-to-peer learning.

5.2. Inferential Results

Chi-square tests of independence and one-way ANOVA were used to explore relationships between selected pairs of items. By contrast, students who believed AI is a form of cheating were less likely to use AI ($F(4, 414) = 36.28, p < .001$), had a more negative attitude about AI ($F(1, 417) = 198.07, p < .001$), were less likely to believe that AI enhances learning ($F(1, 417) = 285.67, p < .001$), did not want guidance from teachers about AI ($F(1, 417) = 39.54, p < .001$), and were less comfortable with the idea of incorporating AI into the curriculum ($F(1, 417) = 106.63, p < .001$).

6. Discussion

The study focused on addressing the limited research about the attitudes of high school students at a fully

remote, online K-12 school towards using AI models like ChatGPT for educational purposes and their feelings about receiving guidance from teachers on effectively utilizing these AI models to support their academic work.

The researchers surveyed 643 high school students who were enrolled in online math courses at a large virtual school in the Southeastern portion of the United States. The participants self-identified their grade levels. Freshmen made up the majority of the participants (29.9%), followed by sophomores (28.1%), juniors (20.1%), and seniors (9.8%). Approximately 12% of participants did not report a grade level.

The researchers surveyed students about the frequency of students' usage of AI tools for academic work. More than half of the participants (54%) indicated that they never use AI for academic work. It was interesting that only 3% of participants indicated that they use AI most of the time or always for academic work.

Students were surveyed about their use of AI tools like ChatGPT in various school subjects. According to the survey, 11% of students reported using AI tools for subjects other than Math, Science, English, or History. Interestingly, Math was the core subject where students reported the highest usage of AI tools, with 37% indicating they used AI tools for Math.

Researchers were interested in students' attitudes toward using AI tools like ChatGPT for academic purposes. Nearly half of the participants (48%) indicated a neutral attitude regarding the use of AI tools for educational purposes. Participants also indicated a positive or very positive attitude about AI usage in education (29%); however, 23% of participants had a negative or very negative attitude about AI usage in education. The mixed attitudes toward AI highlight the importance of addressing AI usage in the classroom. The overall neutral attitude about AI usage could suggest that teachers and other K-12 online school stakeholders must develop clear policies and procedures regarding AI usage in the virtual classroom.

The participants were surveyed about their perceptions of AI tools like ChatGPT enhancing students' learning experiences. The majority of students surveyed (46%) indicated that students believe AI tools have the potential to help their learning. It was interesting to note that a total of 55% of participants disagreed that AI could enhance learning or were unsure whether AI has the potential to enhance learning.

Researchers were also interested to discover students' perceptions about whether or not using AI tools could be considered cheating or not. Survey results showed little consensus among students about whether using AI tools was a form of cheating. Approximately 37% of participants responded in the affirmative, that using AI tools was considered cheating; however, 28% of participants indicated that using AI tools was not a form of cheating when used for educational purposes.

One of the flagship questions of the study was whether online K-12 students want to learn how to utilize AI in their academic work. The results revealed a diverse range of attitudes. Over half the students (55%) indicated that they would “probably” or “definitely” like to receive guidance from their teachers about how to use AI tools for schoolwork. However, some 27% of participants indicated

that they would not prefer to receive such guidance, and 18% of participants were unsure about the topic. Notably, there seemed to be a correlation between students' general attitudes toward AI and their interest in learning about it. Students who indicated that utilizing AI was cheating (36.6%) and students who had more negative feelings about AI (23%) were uninterested in their teachers helping them learn how to use AI tools for schoolwork and were more uncomfortable with AI being part of their classes.

Students indicated on the survey that they were mostly comfortable (56%) with teachers incorporating AI tools into coursework, while 17% expressed discomfort with the idea. Notably, a significant portion of students (27%) were neither comfortable nor uncomfortable with teachers incorporating AI into coursework. This neutral stance from over a quarter of respondents was intriguing and warranted further exploration.

The researchers wanted to know about K-12 students' concerns about using AI tools for academic purposes. Most students indicated a concern for loss of critical thinking skills due to a reliance on AI tools (28.5%). Another 25.7% of students indicated that they perceived a possible challenge with relying too much on technology. Other students indicated concerns about the impact of AI on creativity (8.4%) and concerns about ethical issues related to AI usage (10.4%). Some students indicated they were unconcerned about the usage of AI tools (21.2%). A chi-square goodness-of-fit test indicated that the responses were not evenly distributed ($\chi^2(5) = 178.70, p < .001$). Overall, students indicated concerns about critical thinking skills and an over-reliance on technology.

Finally, researchers wanted to know what students perceived to be the most effective suggestion for teachers when integrating AI tools into learning experiences. Overall, participants indicated they wanted the flexibility to explore AI tools independently without the aid of a teacher (29.5%). Other students indicated they would prefer step-by-step tutorials about how to properly use AI tools (22.2%), and other students showed a preference for teachers incorporating AI tools into specific lesson plans (20.7%). An equal percentage of students indicated they preferred to be offered workshops or training sessions about how to use AI tools (11.4%) and students wanted to collaborate with other students to develop AI-based projects (11.4%). A chi-square goodness-of-fit test indicated that the responses were not evenly distributed ($\chi^2(5) = 158.15, p < .001$).

7. Conclusion

This study revealed the complex perceptions of high school students at a fully online public school about AI usage. While most students reported they were not yet regularly using AI tools for schoolwork, there was a notable mix of attitudes ranging from neutral to positive and negative. The findings highlighted students' significant uncertainty around the ethical implications of AI use, particularly whether it constitutes cheating. Importantly, students' beliefs about AI strongly correlated with their usage patterns and overall attitudes towards its integration in education. This underscores the critical need

for clear guidance and open dialogues about AI in academic settings.

As AI continues to evolve and make an impact education, addressing students' concerns, clarifying ethical boundaries, and providing structured support for appropriate AI use will be crucial in shaping a balanced and effective approach to AI integration in high school curricula. The study has found that online teachers have a significant opportunity to shape students' perceptions about AI. With over half of the students expressing a desire for guidance on using AI tools, educators can play a pivotal role in helping students navigate the complexities of AI, fostering a more informed and positive attitude towards its use in education.

To address the shortcomings of AI in education and ensure it becomes a truly useful tool for students rather than a crutch, several strategies can be implemented. Educators should provide structured guidance on effective AI use in the online classroom, including tutorials and lesson plans that incorporate AI tools. Online educators should devote time teaching students to critically analyze AI-generated information and cross-reference it with other sources. This will enhance students' critical thinking and problem-solving skills. Clear, direct policies on ethical AI use, coupled with AI detection tools and lessons about ethical AI use, will promote academic integrity. Combining AI tools with traditional teaching methods and encouraging interactive learning activities can help students develop a balanced skill set. Implementing AI literacy programs and providing professional development for teachers will further support effective AI integration. Additionally, educating students about data privacy and ensuring AI tools comply with privacy regulations will address security concerns. By adopting these strategies, educators can help students use ChatGPT and other AI tools as valuable educational tools that enhances learning.

8. Recommendations of Future Research

Researchers interested in students' perceptions and utilization of AI in K-12 education would do well to focus research on a longitudinal study to track changes in students' attitudes and usage patterns of AI tools over time. In addition, researchers would find valuable data by studying the impact of AI on learning outcomes examining the impact of AI tools on students' learning across various subjects. Furthermore, researchers should investigate the ethical implications of AI and education exploring the implications of AI at a greater depth. Finally, further research would be beneficial in the area of AI and Literacy. Researchers would do well to assess the effectiveness of AI literacy programs and workshops in improving students' understanding and responsible use of AI tools.

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References

- [1] Arnesen, K. T., Hveem, J., Short, C. R., West, R. E., & Barbour, M. K. (2019). K-12 online learning journal articles: Trends from two decades of scholarship. *Distance Education*, 40(1), 32 – 53.
- [2] Ashe, S. J., & Lopez, R. M. (2021). Communication in online learning – How important is it? *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 94(1), 15 – 30.
- [3] Akgun, S., & Greenhow, C. (2022). Artificial intelligence in education: Addressing ethical challenges in K-12 settings. *AI and Ethics*, 2(3), 431 – 440.
- [4] Fütterer, T., Fischer, C., Alekseeva, A., Chen, X., Tate, T., Warschauer, M., & Gerjets, P. (2023). ChatGPT in education: Global reactions to AI innovations. *Scientific Reports*, 13(1), 15310.
- [5] Mintz, J., Holmes, W., Liu, L., & Perez-Ortiz, M. (2023). Artificial Intelligence and K-12 Education: Possibilities, Pedagogies and Risks. *Computers in the Schools*, 40(4), 325 – 333.
- [6] Hadi Mogavi, R., Deng, C., Juho Kim, J., Zhou, P., D. Kwon, Y., Hosny Saleh Metwally, A., Tlili, A., Bassanelli, S., Bucchiarone, A., Gujar, S., Nacke, L. E., & Hui, P. (2024). ChatGPT in education: A blessing or a curse? A qualitative study exploring early adopters' utilization and perceptions. *Computers in Human Behavior: Artificial Humans*, 2(1), 100027.
- [7] Abdelghani, R., Sauz é on, H., & Oudeyer, P.-Y. (2023). Generative AI in the classroom: Can students remain active learners? *NeurIPS' 23 Workshop on Generative AI for Education (GAIED)*. arXiv: 2310.03192v2.
- [8] Zastudil, C., Vaughn, J., Rogalska, M., MacNeil, S., & Kapp, C. (2023). Generative AI in computing education: Perspectives of students and instructors. *arXiv*. <https://arxiv.org/abs/2308.04309>.
- [9] AI in education: Introduction. (2023, August 7). *Britannica Education*. <https://britannicaeducation.com/blog/ai-in-education/#:~:text=No%20where%20you%20stand%2C%20understanding,teaching%20a%20computer%20to%20checkers>.
- [10] Wu, T., He, S., Liu, J., Sun, S., Liu, K., Han, Q.-L., & Tang, Y. (2023). A brief overview of ChatGPT: The history, status quo and potential future development. *IEEE/CAA Journal of Automatica Sinica*, 10(5), 1122 – 1136.
- [11] Zhang, K., & Aslan, A. B. (2021). AI technologies for education: Recent research & future directions. *Computers and Education: Artificial Intelligence*, 2, 100025.
- [12] Cano, Y., Venuti, F., & Martinez, R. (2023). ChatGPT and AI text generators: Should academia adapt or resist? *Harvard Business Publishing - Education*. <https://hbsp.harvard.edu/inspiring-minds/chatgpt-and-ai-text-generators-should-academia-adapt-or-resist>.
- [13] Huang, Z., Wang, M., & Yang, K. (2023). The Impact of ChatGPT on the Learning Efficacy of Chinese College Students. *Lecture Notes in Education Psychology and Public Media*, 21(1), 289 – 298.
- [14] Elbanna, S., & Armstrong, L. (2023). Exploring the integration of ChatGPT in education: Adapting for the future. *Management & Sustainability: An Arab Review*.
- [15] Holmes, W., & Anastopoulou, S. (2019). What do students at distance universities think about AI? *Proceedings of the Sixth (2019) ACM Conference on Learning @ Scale*, 1 – 4.
- [16] Kim, J., Merrill, K., Xu, K., & Sellnow, D. D. (2020). My Teacher Is a Machine: Understanding Students' Perceptions of AI Teaching Assistants in Online Education. *International Journal of Human – Computer Interaction*, 36(20), 1902 – 1911.
- [17] Ngo, T. T. A. (2023). The Perception by University Students of the Use of ChatGPT in Education. *International Journal of Emerging Technologies in Learning (IJET)*, 18(17), 4 – 19.
- [18] Bitzenbauer, P. (2023). ChatGPT in physics education: A pilot study on easy-to-implement activities. *Contemporary Educational Technology*, 15(3), ep430.
- [19] Yilmaz, H., Maxutov, S., Baitekov, A., & Balta, N. (2023). Student Attitudes towards Chat GPT: A Technology Acceptance Model Survey. *International Educational Review*, 1(1), 57 – 83.
- [20] Abdaljaleel, M., Barakat, M., Alsanafi, M., Salim, N. A., Abazid, H., Malaeb, D., Mohammed, A. H., Hassan, B. A. R., Wayyes, A. M., Farhan, S. S., El Khatib, S., Rahal, M., Sahban, A., Abdelaziz, D. H., Mansour, N. O., AlZayer, R., Khalil, R., Fekih-Romdhane, F., Hallit, R., ... Sallam, M. (2023). Factors influencing attitudes of university students towards ChatGPT and its usage: A multi-national study validating the TAME-ChatGPT survey instrument [Preprint]. *Social Sciences*.
- [21] Fabella, F. (2023). Attitudes toward the Positive and Negative Features of Chat GPT by Selected First Year College Students. *International Research Journal of Modernization in Engineering Technology and Science*.
- [22] Dao, X.-Q., Le, N.-B., Phan, X.-D., & Ngo, B.-B. (2023). Can ChatGPT pass the Vietnamese National High School Graduation Examination? (arXiv:2306.09170). *arXiv*. <http://arxiv.org/abs/2306.09170>.
- [23] Chan, C. K. Y., & Tsi, L. H. Y. (2023). The AI revolution in education: Will AI replace or assist teachers in higher education?
- [24] Idroes, G. M., Noviandy, T. R., Maulana, A., Irvanizam, I., Jalil, Z., Lenoni, L., Lala, A., Abas, A. H., Tallei, T. E., & Idroes, R. (2023). Student perspectives on the role of artificial intelligence in education: A survey-based analysis. *Journal of Educational Management and Learning*, 1(1), 8 – 15.
- [25] Fisher, R. A. (1992). Statistical methods for research workers. In S. Kotz, & N. L. Johnson (Eds.), *Breakthroughs in statistics*. Springer Series in Statistics. Springer.



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