

Students' Perception of ChatGPT Usage in Education

Irena Valova, Tsvetelina Mladenova, Gabriel Kanev

Computer Systems and Technologies, University of Ruse, Ruse, Bulgaria

Abstract—This research article delves into the impact of ChatGPT on education, focusing on the perceptions and usage patterns among high school and university students. The article begins by introducing ChatGPT, emphasizing its rapid user adoption and widespread interest. It explores the application of ChatGPT in various fields, including healthcare, agriculture, and education. A comprehensive survey involving 102 students, both high school and university, is detailed, covering aspects like familiarity with ChatGPT, reasons for usage, self-assessment of its effectiveness, and attitudes toward informing teachers about its use. The findings reveal varied perspectives on the benefits and challenges of incorporating ChatGPT in the learning process. The article concludes by emphasizing the need for careful consideration and integration of AI technologies in education, highlighting the risks of uncritical reliance on such tools and advocating for a balanced approach to foster students' critical thinking and intellectual growth.

Keywords—Artificial intelligence in education; assessment; ChatGPT; Generative Pretrained Transformer 3, GPT-3; higher education; learning, teaching; Natural Language Processing (NLP)

I. INTRODUCTION

ChatGPT is a language model (chatbot) created by OpenAI that allows humans to interact with a computer naturally. A chatbot is an application used to conduct a conversation through the exchange of text messages or text-to-speech between a human and a computer/machine. These are computer programs that can hold a conversation with a user in natural language, understand their intent, and respond based on predefined rules and data. Designed to convincingly simulate the way a human would behave as a conversation partner, chatbot applications typically require constant tuning and testing. While working they are self-educating and improving.

For many researchers and for high education itself, it is important to see how high-school students (in their final years of high school) and university students perceive the idea of using such chatbots in their studies. This article is an examination of the adoption of AI by the students – how they are using it, how frequently, what type of questions they ask it, to what degree they understand the answers, and how they implement them in their class assignments.

This article is the result of an analysis of a questionnaire given among 102 Bulgarian students. It presents the questions, their answers, and some thoughts about the results. While the survey was anonymous, the respondents are students, the authors, are teaching and therefore we have first-hand observations about their problem-solving skills and their thought patterns.

It is obvious that this type of AI is here to stay, and it is up to the universities how they will be able to adopt and use it. Conducting such surveys will help them to understand it better and apply it efficiently.

II. LITERATURE REVIEW

OpenAI is an artificial intelligence (AI) research and Implementation Company ensuring that general-purpose artificial intelligence benefits all of humanity. The company is dedicated to putting this alignment of interests first even before profit.

The definition of AI characterizes it as a branch of computer science that deals with the automation of intelligent behavior. The degree of intelligence is difficult to define, and therefore artificial intelligence cannot be precisely defined either. The term is used to describe systems that aim to use machines to emulate and simulate human intelligence and related behavior. This can be achieved through simple algorithms and predefined models, but it can also become much more complex.

ChatGPT (Chat Generative Pre-trained Transformer) was publicly presented in the summer of 2020 and launched in November 2022. It is an object of curiosity, controversy, and scientific interest among a wide range of Internet users from all ages and stages of life. Unlike search engines (such as Google, Bing, or Baidu), ChatGPT does not crawl the web for information about current events and information, and its knowledge is limited to things it learned before January 2022. It is the subject of many comments and discussions, from the fact that some analysts see it as a threat to some professions, to the fact that others believe that this technology is extremely successful and useful. Although this is not the first application based on artificial intelligence, it can be said that it is the most tested and has generated the most interest among users. The first million users were reached in just five days, which for other platforms took months and years (for example, Facebook reached a million users in 10 months in 2004). In just three months, ChatGPT users reached one billion (see Fig. 1), [<https://www.tooltester.com/en/blog/ChatGPT-statistics/>]. The first reactions are obviously to test and see how this brand-new technology works, and if it works. Almost immediately after testing, reasonable questions arise as to how useful and how dangerous such technology is. Many studies have analyzed the impact on different professions and business fields [1], and the impact on different fields of study [2] and industry [3].

In study [4], the authors conclude that the presence of various AI agents such as ChatGPT will change the context of higher education, but this will not be disruptive. It is very important to realize and assess this transformation promptly and to model it appropriately.

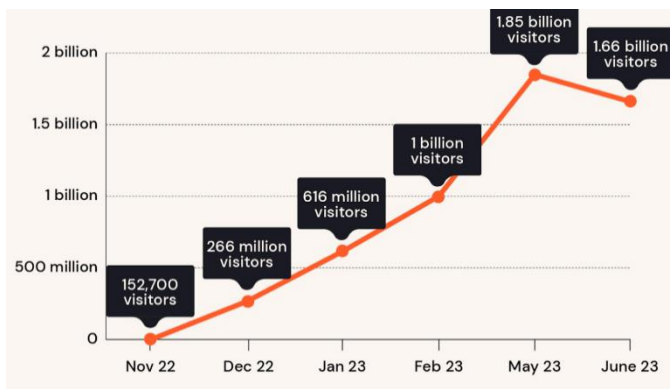


Fig. 1. ChatGPT visitors since release.

The impact of ChatGPT is examined in various fields, such as healthcare, medicine, and dentistry [5, 6]. Its impact and expectations in the field of agriculture and livestock breeding are also examined.

Today's agriculture uses various smart technologies and collects large volumes of data that can be used for crop forecasting, soil analysis, identification of crop diseases and pests, precision farming and irrigation planning, animal behavior analysis, and assessment of their condition. This can be helpful for businesses to make informed decisions and increase their profits. In study [7], the author investigates the potential positives and negatives of the application of chat GPT in agriculture. He provides examples of questions where ChatGPT can be useful in agriculture by analyzing and editing its answers. These are assessments of atmospheric conditions, soil, and air quality, diseases of different crops, and others. The author is noting the following points of ChatGPT usage that are valid for every other usage area:

- Strong dependence on data quality - if the data is inaccurate, biased, or incomplete - this will inevitably affect the responses from the agent;
- Lack of experience - ChatGPT is good at analyzing data but is not a specialist in any specific field and it is very important to have an experienced professional in the relevant field to interpret the model results and make the final decisions. The human factor cannot be avoided, and the specialists have the final say on the decisions.

Will it replace university professors or classroom teachers - this question is being asked more and more often. In research [8], the authors made a qualitative analysis based on a methodology for data collection, documentation, and drawing conclusions, which analysis shows that ChatGPT can only be a tool in training, and it is not possible to completely replace the trainer. It is more important to find an appropriate way to integrate technology into the learning process and, respectively, to develop the competencies of teachers in managing learning with such technologies.

Some researchers evaluate ChatGPT as an opportunity to increase the effectiveness of training and the motivation of students [9, 10, and 11] because the use of this new technology allows learning at an individual pace of the student and

because students choose the direction of deepening their knowledge, they are much more motivated. ChatGPT provides personalized and interactive help, which engages more learners and develops self-learning skills.

It is natural to think in the direction of whether to allow or block access to ChatGPT in educational institutions [12] or whether to look for applications that detect if a given text is generated by ChatGPT. Before any measurements are taken it is interesting to see whether it is used and to what extent is used by the students.

The detailed analysis of the possibilities and limitations of ChatGPT made in [13, 14] shows that the use of this technology has great potential for application in the field of education, but it also comes with quite a few limitations and challenges. The use of ChatGPT, with all its positives and negatives, in training is in its very early stages and this assumes much more research in this area.

The results of the analysis of the use of ChatGPT in the different areas of higher education show a major problem in scientific writing [15]. Is it plagiarism to use text generated by ChatGPT and how to reference such text, what percentage of such text, relative to the total volume, is permissible in student and faculty scholarly publications are some of the topics examined by the author.

The study in [16] concluded that in the context of using ChatGPT in education, it should be noted that technology can only be a tool and cannot completely replace the role of the teacher. Therefore, it is necessary to integrate technology into learning appropriately and effectively and to develop the competence of teachers in managing learning with such technologies.

How can the use of such technologies be useful?

- Can be used to search for information and ask questions from different fields;
- Can provide help and explain different projects and problems in different areas;
- Can generate text - articles, program code, letters, poetry:

1) You can ask ChatGPT to write an article on any topic, specifying what tone or style to use - formal, casual, persuasive, descriptive, humorous, emotional, technical, and more.

2) Some programmers (IT students too) try to outsource the entire programming process to ChatGPT. It's not that this technology can't write good programming code, but it's still recommended to be used only as an additional tool in this area.

3) There is a free ChatGPT Writer extension for Gmail that can compose emails and messages by correcting grammatical errors, paraphrasing text, changing writing style, and summarizing text.

III. PROBLEMS WHEN USING CHATGPT AND AI TECHNOLOGIES IN EDUCATION

The main group of problems in the use of AI technologies in education is ethical and, more precisely, problems related to plagiarism. If the lecturer and the students have the opportunity to use similar technologies, what will stimulate them to express their position and their opinions? These technologies provide a faster and easier way to create texts on a given topic or to solve set problems or tasks. The students sort of overdo their homework and in this way, they don't acquire the habit of writing and expressing their thoughts, they don't reason, and they don't look for an explanation for the problems they are given to solve, they don't put any thought into it. They may not even read the condition of the given problem or tasks, but simply use the copy-and-paste functions and get the result.

How to make students understand that it makes sense to know the definitions from the learning material so that they can search for information, respectively ask ChatGPT. It is clear that in the modern conditions of Internet access, it does not make sense for them to learn by heart and reproduce a text, it is important to be able to solve problems and tasks and, above all, to learn to think.

The collective opinion that ChatGPT will lead to the extinction of certain professions and thus put many people out of work is relatively popular and shared among the vast majority of people. There is a fear that it will replace the programmers, and more specifically - the junior programmers. However, if it does replace them because it solves elementary tasks perfectly, where will seniors come from if they have not been junior programmers? How will the seniors be so good if they've missed the moment of programming elementary tasks - while they were studying at the university they missed it, and then there was no way to work as such.

ChatGPT can find applications in the learning process as an intelligent assistant. Its particular advantage is that it can provide learners with interactive help at any time and from any place. The authors in [10] specified the following guidelines in which the use of ChatGPT may be useful to students:

- Provide information and resources, answer questions, organize information, help prepare for exams, and provide feedback;
- Improve language skills - grammar, vocabulary, and style during communication with the agent, as well as use ChatGPT to check their written text for syntactic and grammatical errors;
- Provides a new interactive way of learning languages - without restrictions on when and where, and has opportunities to generate realistic dialogues in a chosen and interesting area for the learner; can exercise their foreign language skills if they communicate with him in a chosen foreign language;
- Improving cooperation and communication - if students work in a team, the use of ChatGPT stimulates communication between the participants in the teams and also between them and the teachers;

- Provide support and motivation - ChatGPT can also act as a means of support and motivation for students. They can use ChatGPT to talk about their problems and concerns or ask for advice on how to better manage their time and tasks.

It should be noted that ChatGPT is not the only natural AI agent that can understand and generate conversation in natural human language. In February 2023, Google introduced Bard, which follows the LaMDA model but has similar features and applications [17, 18]. Our research is focused on ChatGPT and therefore does not describe other similar solutions.

IV. RESEARCH METHODS

A. Objectives and Contributions of the Experimental Research

The research aims to investigate the possibilities and extent of the use of ChatGPT by university students and final-year high-school students in the process of their education. Naturally, we consider all the risks and challenges of the unethical and illegal use of such tools in the learning process. The attitude of the students and their assessment of the capabilities of ChatGPT in the learning process are important because this would determine the use of these technologies in schools and universities. 102 surveyed students from the University of Ruse and students in the last year of Mathematical High School "Baba Ton-ka", Ruse, Bulgaria took part in the research and focused on the place and role of ChatGPT as a potential source of knowledge and information for students and students. The main questions that are the aim of the study are:

R1: How familiar are the students with the capabilities of ChatGPT?

R2: What are the potential benefits and challenges associated with using ChatGPT in learning from the learner's perspective?

R3: Are students inclined to use ChatGPT in the university/school and what do they think they will achieve by using it?

R4: Can learners rate the responses received from ChatGPT?

B. Description of the Respondents

The total number of participants in the study is 102, students from the Computer Systems and Technologies specialty of the University of Ruse, Bulgaria, and students in the last year of Mathematical High School "Baba Tonka", Ruse, Bulgaria, who, in addition to mathematics, study informatics and information technologies intensively (see Table I). It is important to specify the major of the students and the subjects they are studying since it is very likely that their IT orientation has some certain influence on the way they accept these new technologies, as well as their natural greater interest in them.

This group of students is chosen because they are students, we have direct observations on. These are students who we teach, thus allowing us to get to know them better.

Regarding the second set of questions about the assessment of R3: Are students inclined to use ChatGPT in the university/school and what do they think they will achieve by using it?

As apparent from R1 the respondents surveyed have tried and used ChatGPT, it's not entirely new to them and some even have quite a bit of experience with it. We were interested to know if they were worried about having used the agent and what they think about the teaching knowing of their usage. A very large part of the respondents (53.9% do not see the point in sharing with the teacher the fact that they had to use this kind of help because they do not think it will improve the teaching or the content of the course and 15.7% are afraid to mention to the teacher, so as not to harm their final grade (see Fig. 5). In a small additional anonymous survey with 1/3 of respondents, regarding a specific homework assignment, 54.5% of participants admitted to using ChatGPT to write the source code implementing the assignment of the homework. 63.6% of the participants had to make corrections to the solution returned by ChatGPT, and the rest used it directly. 81.8% tested with different data and tried to fully verify the functionality of the returned code, and the rest admitted that they had not tested at all or attempted to test with any data, but rather trusted ChatGPT. These results show that trainees are coping and benefiting from using ChatGPT. It is worrying, however, that there are a considerable 20% who use it without thinking about the tasks set and the answers returned, and directly use them to pass them as a solution to homework.

If you used ChatGPT in any discipline, did you tell the teacher?

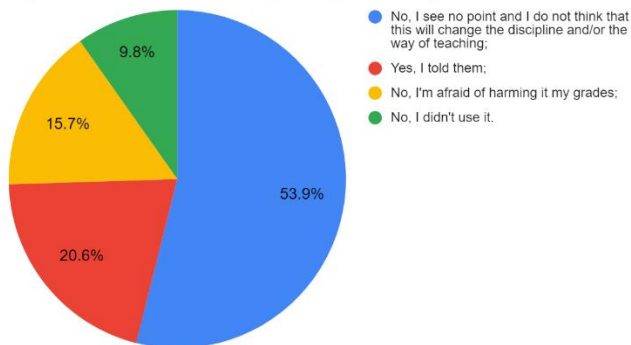


Fig. 5. Answers "If you used ChatGPT in any discipline, did you tell the teacher?"

Another question in the survey gives an example of a small programming task that usually could be given as homework or in a workshop. The question itself states: "You have a task for finding the shortest path in a graph in C++..... Write the question that you would ask ChatGPT". The answers vary from complete copy-paste of the text of the task to breaking down the steps they would take to explain their problem to ChatGPT and to paraphrase the question. Some of the most interesting answers are:

- "No question just ctrl + c and ctrl + v on the task, He understands it and if my ideas are different from his answer then I ask specific questions, but this is rarely necessary."

- "I would like to give me the whole code so I can get the idea of how the algorithm works, then I'd try to write the code myself and if something doesn't work out I'd check from the already given answer."
- "Make me a road map for all the algorithms for finding the shortest path in a graph, ranking them for me from good and used to not so much, taking into account speed, complexity, and all advantages."
- "Write me some C++ algorithms that can find the shortest path in a graph from vertex A to vertex B."
- "Algorithms for shortest path in a graph C++".

It is interesting to note that from 102 answers, only 13 are in English. That gives the impression that the students are more willing to ask in their native language, in this case - Bulgarian, and receive the answers in the same language. While the ability of ChatGPT to understand and perceive different languages there are some cases where the agent is confused and thus susceptible to wrong answers. Fig. 6 shows a conversation with ChatGPT where the Bulgarian language is incorrectly recognized as Russian and the chat needs several interactions to understand and correct the problem.

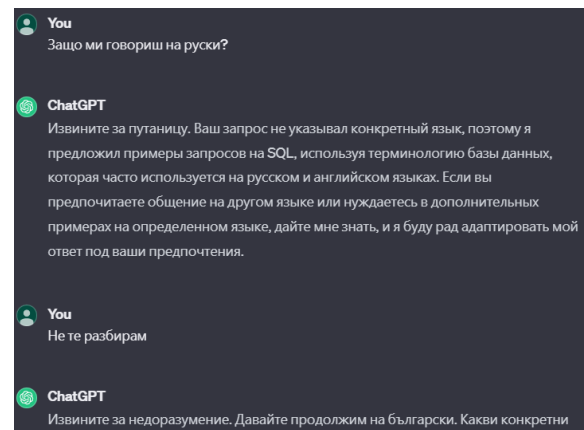


Fig. 6. Screenshot of confused ChatGPT.

It is interesting to see if they need any additional guidance and pointers on how to use it if they are officially allowed to use AI agents. Only 8.8% felt they needed help at least in the beginning, and 66.7% would use it directly themselves without a problem (see Fig. 7).

Apart from whether they have used or would use it is interesting to see how they use ChatGPT and what types of questions they ask. The reason behind this is that a large proportion of the respondents have expressed their desire for copy able text assignments in the past. Students, and more specifically, the students who have responded to the survey, do not like assignments that are spoken and explained aloud. Here, it should be noted that the assignments in question, are simple tasks, meant to be done in the timespan of a workshop and not homework assignments.

If the teacher allows you to use ChatGPT in your discipline, would you use it?

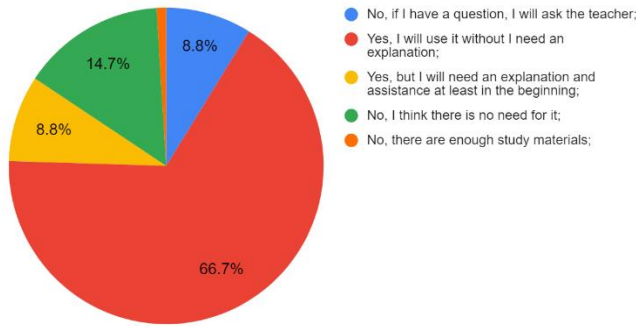


Fig. 7. Answers "If the teacher allows you to use ChatGPT in your discipline, would you use it?"

Pretty quickly it came as obvious to this attachment to the text format. Given an assignment with 10 tasks, some students produce the answers in less than five minutes, which under normal circumstances is impossible, as it is physically impossible to write a programming source code for such a short time. Upon close inspection of the provided answers, it is not difficult to notice that they are generated by AI, as some small details are not described in the assignments and are known by the lecturers. This whole situation is quite an obvious sign of ChatGPT usage.

Fig. 8 shows that according to the self-assessment of the respondents, 46.1% try to ask guiding questions to the agent to orientate themselves in the problem and the topic based on the answers received. Some of them (18.6%) try to break the assignment into separate problems, ask questions related to them, and then summarize and combine the information from the received answers. There are still 18.6%, who don't bother to think about the task they have and directly give it to ChatGPT to get the ready answer. There are also 10% of respondents who do not have much success using the chatbot because they cannot ask their questions in a way that it understands them correctly.

Regarding the received answers is shown in Fig. 9. 42.2% of the respondents used the chat just for pointers about their problem and the same percentage found mistakes in the answers that they corrected before submitting or using them. A relatively small percentage, but still a notable percentage – 8.8% directly used the received answers without any corrections. This raises the question about their ability and willingness to further check and dive into the problem. 6.9% answered that they had not used the solution provided by ChatGPT. While the percentage is small, it is interesting to find out why is – maybe the provided solution was not correct at all or was too complex to understand and implement, or they have just wanted to see and play around with the chat.

R4: Can learners rate the responses received from ChatGPT - According to the results shown in Fig. 10, 30.4% of respondents do not bother to check the answers received from the chatbot, with 24.5% trusting them completely. Almost 20% check each answer further, and 50% first consider whether the answer can be used and only then check it.

What type of questions do you ask ChatGPT?

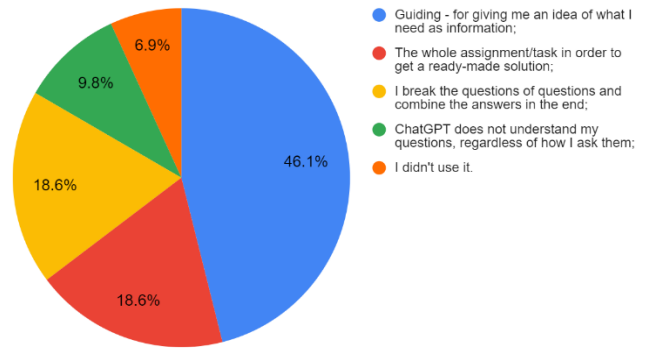


Fig. 8. Answers to "What type of questions do you ask ChatGPT?"

Did you directly use the solution/answer that ChatGPT returned?

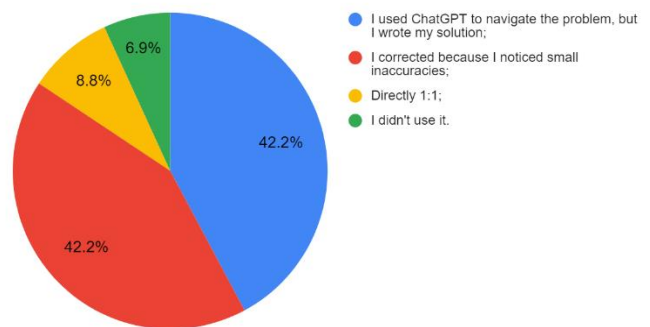


Fig. 9. Answers to "Did you directly use the solution / answer that ChatGPT returned?"

Using ChatGPT do you check the answer in other sources?

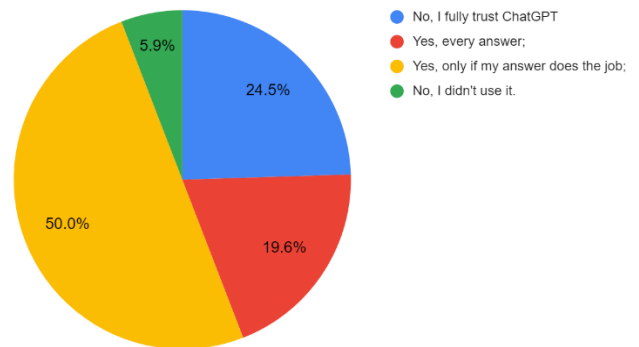


Fig. 10. Answers of "Using ChatGPT do you check the answer in other sources?"

To assess how the respondents think about the answers from the chatbot, a question in which two definitions are given for the same term (in this case it is a definition of a set). All participants are aware of the term and use it in the learning and programming process. They are given a definition of the concept that is popular in textbooks and a definition given by ChatGPT. Their task is to evaluate the two definitions. The received answers show that for the respondents it does not matter whether the definition will be strictly formulated (in this case, it is the second definition, the one from the textbooks) or

it will be in a more descriptive form and with few examples (the first, from ChatGPT) - still for 38.2% the answer returned by ChatGPT is clearer and more understandable and they are more likely to trust it. For 31.4% the strictly theoretical versions is more understandable, and for 15.7% of the respondents, both are equally clear (see Fig. 11). What's worse is that for 14.7%, neither of the two definitions or explanations is comprehensible, and as we said - this is certainly something familiar to them, or at least should be.

Which of the two definitions below is more understandable to you?

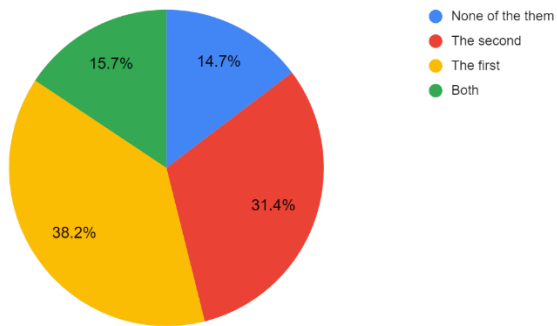


Fig. 11. Answers to "Which of the two definitions below is more understandable to you?"

VI. CONCLUSIONS

The usage of ChatGPT and similar AI-based technologies is something that is going to be more and more common. As lecturers and teachers, it is up to us to be able to navigate and adapt to it. The students have this very tempting, interesting, and easy-to-use at first glance technology. It is expected that they will be tempted to use it, after all this is an easy way to pass an exam and receive an excellent grade. While the education system does have its flaws and rewards excellent grades, the usage of these types of systems can and should be used in more efficient and effective manners to help with developing the thinking and problem-solving skills of the students.

From the experiment described in this article, the following can be concluded:

- ChatGPT systematizes sources of information found on the Internet on a given topic and saves time and effort;
- It provides personalized feedback and assistance to students anytime and from anywhere where they have access to the Internet;
- There is a real danger that students will learn false, malicious, or biased information if they rely entirely on ChatGPT without verifying the authenticity of what is written. As the survey shows, they do not pay enough attention and accept the answers as true;
- There is a real danger of fraud in the preparation of academic texts, cheating and plagiarism;
- The answers from ChatGPT can be deceiving and if the students are trusting it blindly, as this survey has proven to be the case, this can lead to bigger problems in the

future. Many of today's students are going to develop the habit of copy-and-pasting their problems in such chats and are going to stop developing their critical thinking thus limiting their intellectual growth.

This research underscores the undeniable potential of ChatGPT in reshaping educational dynamics. However, it also emphasizes the critical need for responsible integration. The findings spotlight the importance of equipping students with the skills to discern between AI-generated content and authentic knowledge. Striking a balance between leveraging AI for efficiency and preserving the essence of intellectual growth remains imperative in the evolving landscape of education.

While ChatGPT demonstrates remarkable capabilities, the study accentuates the irreplaceable role of human guidance in education. The findings highlight that, despite AI's potential to enhance learning experiences, it should be viewed as a tool rather than a substitute for human educators. The emphasis is on developing strategies to effectively integrate AI while ensuring that students receive the mentorship and critical thinking skills essential for their development.

As ChatGPT and similar AI technologies become integral to the educational experience, there is a pressing need to incorporate ethical AI education. The study underscores the importance of guiding students in understanding the ethical implications of relying on AI tools. Educators are encouraged to incorporate discussions on responsible AI use, fostering a generation that not only embraces technological advancements but also critically evaluates their impact on learning and intellectual development.

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