



Article

ChatGPT—A Challenging Tool for the University Professors in Their Teaching Practice

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Abstract: ChatGPT has aroused the users' interest and provoked educators, researchers, and educational institutions about its role in education. Its proper integration into education can support teaching and learning activities and highlight the benefits of digital technologies. ChatGPT can be an intelligent learning assistant for learners and educators, supporting personalized and adaptive learning. At the same time, ChatGPT can be used unfairly and unethically, which causes severe concerns among educators, educational institutions, and society. Educators' attitudes regarding their application, expectations, and concerns are very important in the emergence and introduction of new technological tools in education. The current paper aims to explore the opinion of university professors at a Bulgarian university regarding the possibilities and challenges of ChatGPT in carrying out teaching activities. The findings of the conducted survey show that university professors from Trakia University in Bulgaria have an overall positive attitude regarding the implementation of ChatGPT in their teaching practice (41.4%). They perceive ChatGPT as a means to support time-consuming teaching activities (60.9%), provoke interest, activate and engage learners (59.8%), and stimulate their critical thinking and creativity (47.1%). In parallel, the university professors are concerned about possible risks of its unethical use that threaten the validity and fairness of assessment practices. The most severe problem for them is the danger that learners will completely trust ChatGPT without checking the authenticity of the generated texts (73.6%), which can negatively affect the acquisition of knowledge and skills.



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Keywords: artificial intelligence; ChatGPT; higher education; teaching; university professors' perceptions

1. Introduction

In recent months, ChatGPT has become very popular, drawing public attention to the use of artificial intelligence applications in various areas of public life. The situation resembles the popularity of the Pokemon Go game, which gave a strong impetus to the application of Augmented Reality technology in various spheres, including education.

Since the introduction of ChatGPT in November 2022, there has been a lot of interest in its capabilities from both users and education experts. Discussions in scientific fields are related to the effective use of ChatGPT in education, the benefits that can be obtained, how to overcome the challenges and risks, and what changes will occur when integrated into education. At the moment, there is a lack of in-depth empirical research and results of possible applications of ChatGPT in learning since it has been used by teachers and learners for a short time.

The effect of the application of different technologies or pedagogical approaches in learning is visible over time. The results of the integration of applications with artificial intelligence (AI) and, in particular, ChatGPT will be possible to analyze years from now. What is clear now is that increased interest and engagement are being reported, but we can only guess what the results will be in terms of acquired knowledge, skills, and competencies by learners and readiness for professional development and career.

The topics of providing personalized and adaptive training and integrating activities that stimulate the critical and creative thinking of learners are increasingly relevant. Applications that are based on AI, including ChatGPT, can be suitable tools to provide personalized support and guidance to each learner based on his learning status, preferences, and personal characteristics [1]. They can contribute to increasing learners' engagement and motivation to learn through appropriate integration into the learning process, tailored to the learners' educational needs, aimed at achieving specific learning goals. The self-serving use of digital technology just because it is fashionable and supposed to attract learners' attention and provoke their interest cannot lead to positive results.

The emergence of new tools, especially those based on AI, raises concerns that technology may replace the teacher in the classroom. ChatGPT can support and automate the activities of educators, but their role as mentors who provide guidance and more profound assessment of learner abilities and role models cannot be entirely replaced by technology [2]. ChatGPT, a generative artificial intelligence (GAI) representative, can create quizzes and assignments that are automatically checked and graded, generate feedback, and provide personalized learning content depending on the learners' results. Such capabilities should not be seen as a threat to the role of teachers but as an advantage that saves their time and effort in performing routine actions.

The most severe concerns arise from the ability of GAI to generate academic texts, which calls into question the validity and integrity of examination procedures. Overcoming such challenges requires changes in learners' knowledge and skills assessment. There is a need to replace traditional assessment methods with more innovative techniques, where AI applications cannot complete tasks with a high degree of correctness.

Dependence on digital technologies is among the severe risks in education. Overuse of AI applications for task performance and problem-solving can lead to human unintelligence and severe gaps in learners' academic and professional development [3].

User acceptance of new technologies and tools is critical to the successful uptake of technological innovation [4]. Regardless of the advantages and disadvantages of digital technologies, their successful integration into learning depends on the attitudes of educators and learners regarding their use for educational purposes.

Aims and Contributions

This study presents the benefits and possibilities of using ChatGPT for educational purposes, considering the risks, threats, and challenges of unethical and incorrect use of such tools.

Educators' attitude to the application of ChatGPT in teaching is essential and determines how effective can be. For this purpose, a survey was conducted among the university professors at Trakia University—Stara Zagora, Bulgaria, to find out whether they are familiar with ChatGPT, how frequently they use it in their daily life, and for what purposes. The research focuses on the place and role university professors assign to ChatGPT in their teaching activities and their concerns and fears about applying GAI.

The main research questions of the conducted study are

- R1:** How familiar are the university professors with the capabilities of ChatGPT?
- R2:** What are the potential benefits and challenges associated with using ChatGPT in teaching and learning from the university professors' perspective?
- R3:** Are university professors inclined to implement ChatGPT in teaching, and what do they think they will achieve by using it?

The rest of the paper is organized as follows: Section 2 presents related work in the field of application of ChatGPT in education; Sections 3 and 4 present the organization, methodology, and results of the conducted study; in Section 5, the results and their relevance to other similar studies are discussed; Section 6 reports the limitations of the research and future research directions; and Section 7 concludes the study.

2. Related Literature Review

2.1. The Model ChatGPT

An artificial intelligence system is defined in a European Parliament report as “a system that is either software-based or embedded in hardware devices, and that displays behavior simulating intelligence by, inter alia, collecting and processing data, analyzing and interpreting its environment, and by taking action, with some degree of autonomy, to achieve specific goals” [5] (p. 6).

AI is the science that deals with programming a computer, computer-controlled robot, or software to think intelligently as humans do. This requires understanding how the human brain works, how people learn, decide or operate when solving a problem, and then using the results to construct intelligent software [6].

AI-based machines can mimic or even exceed human cognitive abilities, including sensing, language interaction, reasoning and analysis, problem-solving, and creativity [7].

Distinguishing the basic terms and concepts related to AI is necessary to better understand how they work and how they are applied. There are differences in algorithms between machine learning, deep learning, and natural language processing (NLP), of which ChatGPT is the primary representative [8].

A chatbot is a software program that uses user input to simulate human-like interaction [6]. It simulates natural conversations with users through text or voice messages [9].

ChatGPT is a language model created by OpenAI that allows people to interact with a computer in a natural way. ChatGPT is a GAI as it has the ability to generate original results [7]. The reinforcement Learning from Human Feedback (RLHF) method is used to train ChatGPT, and the created reward models help in its improvement through Proximal Policy Optimization. This process follows three main steps and goes through several iterations. One of the innovations is the possibility to create add-ons (plugins) that provide access to up-to-date information, perform calculations, and use third-party services [10].

It should be pointed out that ChatGPT is not the only natural language processing (NLP) AI model that can understand and generate conversation in natural human language. In February 2023, Google introduced Bard, which follows the LaMDA (Language Models for Dialog Applications) model. Although ChatGPT and Bard have similar functionalities and applications, they differ in the number of tokens, token limits, Conversation Retention, human interaction, and response accuracy [11]. For the purpose of our research, we explore in detail only ChatGPT.

2.2. Benefits of Using ChatGPT in Education

The implementation of chatbots in education shows positive results and can help create a supportive learning environment by providing timely and accurate information and reducing the administrative burden [12].

ChatGPT can function as an intelligent assistant in the learning process and provide learners with interactive help at any time and from any place. ChatGPT can answer questions, systematize information, assist learners in exam preparation, and provide feedback [13]. Learners can discuss with ChatGPT emerging problems or ideas for solving tasks and problem situations [14]. This dialog can help them develop reading and writing skills through discussions about the generated explanations, solutions, and suggestions [15]. By taking on the functions of a mentor or tutor, ChatGPT can help increase learners' motivation and make the learning process more engaging [16].

Ref. [9] has explored the application of ChatGPT in foreign language teaching and learning, considering the advantage of practicing the language through everyday conversations 24/7 at any time and place. This study observed overcoming learners' anxieties through free conversations, stimulating their interest in language acquisition, and ensuring more engaging learning. ChatGPT can generate realistic dialogues and provide learners with authentic examples of language use [17].

The research results show that ChatGPT can generate easy-to-understand explanations and code with a high degree of correctness that are useful in studying algorithm-

mic concepts, identifying errors in the code, and helping with its optimization with time-saving suggestions [15].

ChatGPT can also assist educators and save time and effort in generating learning and assessment materials, allowing them to focus on more complex course design and pedagogy [18]. Instructors can use ChatGPT as an ideation facilitator [19] to generate ideas for lectures, presentations, plans for workshops, and practical lessons [20]. Lesson planning can be a starting point for less experienced teachers [21]. ChatGPT supports educators in generating quizzes and assignments, their assessment, and the provision of personalized feedback [21,22].

ChatGPT can improve access to information and be helpful in collecting and providing information on a given topic to users. Unlike search engines that provide a massive list of links to Internet resources that sometimes lack relevance, ChatGPT provides answers and gives enough information to users without the need to browse through a long list of sources [3]. ChatGPT saves time and effort in searching, finding, and systematizing information, and users can focus on assessing credibility and critically analyzing information [21]. Integration of ChatGPT in education can stimulate learners' critical and creative thinking through discussions about texts that are generated by AI [3] and develop skills for presenting and defending the creative ideas, finding evidence and references for them [23].

ChatGPT can help with personalized and adaptive learning. Based on the analysis of learners' behavior and dialogue, ChatGPT can generate personalized resources and learning activities that meet their educational needs and individual learning styles [15,24]. Educators can monitor learners' progress, clearly view their work and achievements, and respond appropriately by offering timely support and implementing adaptive teaching strategies [25]. Providing personalized feedback to learners [21] enables the identification of problem areas and targeting of performance improvement efforts [24]. Timely feedback allows learners to correct misconceptions, clarify unclear concepts in real time, learn at their own pace, and not rely solely on the instructor, which is especially important for large groups of learners [19]. Personalized and immediate feedback and individualized learning paths lead to increased motivation and engagement, better outcomes, and learners' satisfaction and are essential for those with special educational needs as well [25].

ChatGPT can reduce the administrative burden on educators by assessing learners' assignments and providing feedback [25]. ChatGPT can be used as an assessment tool, including for essays, to shorten the assessment time and provide immediate results and feedback to learners [4].

ChatGPT enables learners to develop new digital skills that are very important in today's technological society. Learners need to formulate the correct questions and prompts, operationalize the tasks, and give precise instructions to get satisfactory answers [26].

2.3. Drawbacks and Challenges of Using ChatGPT in Education

Like any new technology that rapidly is implemented in education, ChatGPT undoubtedly raises a number of concerns among educators.

ChatGPT is a GAI that can create texts whose authenticity cannot be guaranteed. ChatGPT is not a search engine and does not provide factual information but is programmed to generate plausible-sounding text [27]. It is possible for ChatGPT to provide incorrect or misleading answers, which can lead to misinformation and learning the wrong things [14]. A significant risk is the generation of inappropriate content [17] with elements of bias and discrimination [13,21] if a model is trained on a dataset that contains such items [4,17]. In addition, ChatGPT has a knowledge limitation until 2021, which may also result in the generation of incorrect information [13].

Dependence on technology and heavy reliance on generative tools such as ChatGPT can negatively impact the acquisition of knowledge and skills. Obtaining answers easily and quickly and generating completed texts can limit critical thinking and problem-solving skills [15] and significantly reduce the learning experience that students gain [14]. They may not learn basic concepts and have serious gaps that will not allow them to cope with

more challenging tasks due to a lack of background knowledge [14]. In addition, the lack of human interaction may reduce the quality of the educational experience for students [25].

ChatGPT can compromise the validity of assessment practices, especially those involving written assignments, and become a serious threat to academic integrity [4]. One of the most common concerns is that the use of ChatGPT threatens and will inevitably lead to the end of writing texts (the essay) as an assessment method [28]. Many learners just copy the generated text without any critical analysis and no citation [23]. ChatGPT skillfully paraphrases generated responses in a way not detected by plagiarism software [3]. As a preventive measure, a number of universities are banning the use of ChatGPT. The response of others is to change how students are assessed—without papers written at home [7]. Unfair learning assessment is another consequence of using ChatGPT. It is possible learners who use ChatGPT to generate academic texts to have higher results than those who do not use it and rely on their own capabilities and efforts, and this is likely to negatively affect students' emotions [29].

ChatGPT and other generative models involve the collection and processing of personal data, which raises concerns related to privacy and data security and their misuse [15], as well as ethical concerns due to the inability of the tool to determine the user's age and risk young learners being exposed to age-inappropriate responses [7].

Accessibility issues are also possible—the unavailability of the tool in some countries due to government regulations, censorship, or other restrictions, and on the other side, uneven distribution of availability, price, and speed of the Internet [7].

3. Materials and Methods

3.1. Study Participants

Participants for this study were selected from Trakia University—Stara Zagora, Bulgaria. The total number of university professors who took part in the survey is 87. The demographic information is organized in Table 1 and shows that 57 respondents are female (65.52%) and 30 are male (34.48%). The predominant relative proportion of faculty members is between 46 and 55 years old (41.38%), followed by faculty members between 36 and 45 years old (31.03%). The lowest percentage of 2.30% are the university professors aged over 65 years. There are no respondents below 25 years of age.

Table 1. Summary of demographic information (N = 87).

Demographic Characteristics	Options	Frequency	Relative Frequency (%)
Gender	Female	57	65.52%
	Male	30	34.48%
Age	Below 25	0	0%
	25–35	11	12.64%
	36–45	27	31.03%
	46–55	36	41.38%
	56–65	11	12.64%
	Over 65	2	2.30%
Professional Field	Pedagogical Sciences	12	13.79%
	Humanities	9	10.34%
	Social, Economic and Legal Sciences	10	11.49%
	Natural Sciences, Mathematics, and Informatics	23	26.44%
	Technical Sciences	15	17.24%
	Agricultural Sciences	14	16.09%
	Healthcare and Sports	19	21.84%
	Arts	2	2.30%
	Security	1	1.15%

Table 1. Cont.

Demographic Characteristics	Options	Frequency	Relative Frequency (%)
Professional experience	Up to 1 year	4	4.60%
	1–5	16	18.39%
	6–10	12	13.79%
	11–15	16	18.39%
	16–20	12	13.79%
	21–25	16	18.39%
	26–30	4	4.60%
	Over 30 years	7	8.05%

The participants' teaching experience distribution is relatively even, with the highest percentage of university professors (18.39%) with 1–5 years, 11–15, and 21–25 years of experience. The lowest percentage of university professors with teaching experience of up to 1 year is 4.60%.

Professional fields correspond to those mentioned in Bulgaria's Classification of Higher Education Fields and Professional Areas. The distribution of data reveals that the highest share is occupied by university professors in the field of Natural Sciences, Mathematics, and Informatics at 26.44%, followed by university professors in the field of Healthcare and Sports at 21.84%, and Technical Sciences at 17.24%. The lowest relative frequency is Arts (2.30%) and Security (1.15%). The percentages are more than 100%, as respondents can choose more than one professional field. Most of the university professors work in different professional fields and teach courses in different specialties and in different departments.

3.2. Data Collection

For the purposes of this research, a questionnaire was developed using Google Forms. The survey is anonymous and was distributed by email to a group of university professors from Trakia University—Stara Zagora, Bulgaria.

The survey questions can be grouped thematically as follows: demographic characteristics and work experience; degree of familiarity and use of AI applications and ChatGPT in particular; potential benefits and challenges associated with using ChatGPT in teaching and learning; what is the purpose of using ChatGPT in their teaching activities and what they expect as results. Part of the questions include "Other" as an option, and university professors can type a short answer. Others are on a five-point Likert scale, and an open-ended association question is also available.

4. Results

Statistical data processing was performed using the software package SPSS Statistics version 26.

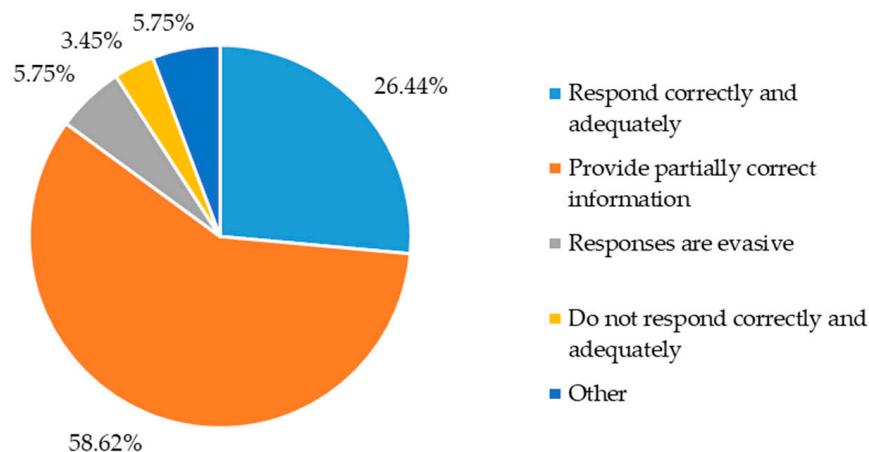
4.1. Results Related to Research Question One

The first research question relates to the level of familiarity and use of AI applications, particularly ChatGPT. Respondents could choose more than one answer, including the option to add another answer; hence, the overall percentages exceed 100%. The summarized responses to this question are presented in Table 2. "Tools for translation" were the most widely used (90.8%), followed by "Applications for navigation" (81.6%), which can be explained by the fact that these applications have been used for many years, they are free of charge, and are related to the teaching and research work of the respondents as well as to their daily activities and needs. Chatbots are in third place, with 52.9%, a representative of which is ChatGPT. This shows that these relatively new applications are also gaining much popularity in the academic sphere. The apps with the lowest percentage of usage are "Fitness Assistant" and "Health Assistant" with 5.75% and "Financial Advisor" (2.30%). Only 3.45% are participants who have not used such AI applications.

Table 2. Types of AI applications respondents use.

What Type of AI Applications Have You Used?	Frequency	Relative Frequency
Chatbots	46	52.87%
Apps for learning	30	34.48%
Virtual assistant	21	24.14%
Fitness assistants	5	5.75%
Health assistants	5	5.75%
Financial advisor	2	2.30%
Image creation and editing apps	11	12.64%
Navigation apps	71	81.61%
Transcription apps	19	21.84%
Grammar correction apps	36	41.38%
Tools for translation	79	90.80%
I have not used	3	3.45%
Banking and company chatbots	1	1.15%

It is evident from the study that university professors are familiar with AI applications and use them, especially those that are related to teaching and academic activities, such as tools for learning, grammar corrections, translation, transcription, and image creation. Participants had to assess the functionality of AI applications and the accuracy of the answers. According to more than half of the university professors (58.6%), these applications “Provide partially correct information”, and 26.4% evaluated them positively and point out that they “Respond correctly and adequately” (Figure 1). Only 3.4% thought they “Do not respond correctly and adequately”. In the option “Other”, several respondents write answers according to their personal experience with these applications. They shared their opinion that the responses received from these tools depended on how the search was set up.

**Figure 1.** Respondents' assessment of AI application functionality.

For the purpose of the study, it was necessary to focus attention and explore the opinion of the university professors about ChatGPT. The question allows more than one answer selection, so the total sum of percentages is more than 100% (Table 3).

A large group of university professors used ChatGPT “Out of curiosity” (43.68%), and 42.53% chose “I have not used it”. These two responses have the highest frequency and could be explained by the fact that this is a new application that some university professors have not used yet. Those familiar with are provoked by curiosity and are exploring its potential possibilities. The primary purposes for using ChatGPT include “Searching for information” (28.74%), “Generating ideas” (20.69%), and “Writing text” (16.09%). It is evident that university professors are still cautious about using ChatGPT for creating learning and exam materials.

Table 3. Purpose of using ChatGPT.

For What Purpose Have You Used ChatGPT?	Frequency	Relative Frequency
Writing a text/article/speech/presentation	14	16.09%
Problem-solving	2	2.30%
Writing programming code	8	9.20%
Dialogue for foreign language practice	6	6.90%
Creating learning materials	8	9.20%
Creating exam materials	4	4.60%
Search for information	25	28.74%
Generating ideas	18	20.69%
Out of curiosity	38	43.68%
I have not used it	37	42.53%

4.2. Results Related to Research Question Two

The second research question is related to university professors' identification of the potential benefits and challenges associated with using ChatGPT in teaching and learning.

A rating system consisting of a 5-point Likert scale is used. It allows respondents to express their level of disagreement or agreement with the statements ranging from 1 (strongly disagree) to 5 (strongly agree).

The frequencies (F), relative frequencies (%), means (M), and standard deviations (SD) of the question responses are given in Tables 4 and 5. The descriptive statistics analysis (Table 4) shows that the university professors identify possible advantages and benefits and have relatively positive perceptions about using ChatGPT in teaching (average values are above 3).

Table 4. Possible benefits of using ChatGPT in the teaching.

What Do You Think is Possible When Using ChatGPT in Teaching and Learning?		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total	Mean	SD
Systematization of information sources found on the Internet on a given topic and saving time and effort.	F	3	6	20	43	15	87	3.7	0.954
	%	3.4	6.9	23	49.4	17.2	100		
Creation of learning scenarios, learning materials and presentations for lectures and practical lessons.	F	4	7	33	34	9	87	3.43	0.948
	%	4.6	8	37.9	39.1	10.3	100		
Creating exam questions, quizzes and assignments for students' assessment.	F	4	9	33	33	8	87	3.37	0.954
	%	4.6	10.3	37.9	37.9	9.2	100		
Provide personalized feedback and assistance to students.	F	7	16	35	26	3	87	3.02	0.976
	%	8	18.4	40.2	29.9	3.4	100		

Table 5. Possible risks of using ChatGPT in the teaching.

What Do You Think Is Possible When Using ChatGPT in Teaching and Learning?		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total	Mean	SD
Cheating by students in the preparation of academic texts.	F	1	3	24	26	33	87	4	0.952
	%	1.1	3.4	27.6	29.9	37.9	100		
Students can learn false, malicious or biased information if they rely entirely on ChatGPT without verifying the authenticity of what is written.	F	1	3	19	34	30	87	4.02	0.902
	%	1.1	3.4	21.8	39.1	34.5	100		

Table 5. Cont.

What Do You Think Is Possible When Using ChatGPT in Teaching and Learning?		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total	Mean	SD
Collection of personal data and sensitive information that can be misused.	F	2	8	33	26	18	87	3.57	0.996
	%	2.3	9.2	37.9	29.9	20.7	100		
Plagiarism	F	1	10	24	33	19	87	3.68	0.982
	%	1.1	11.5	27.6	37.9	21.8	100		

The highest agreement item corresponds to “Systematization of information sources found on the Internet on a given topic, which saves time and effort”, which was positively reported by 66.6% of respondents ($M = 3.7$, $SD = 0.954$). According to 49.4% ($M = 3.43$, $SD = 0.948$) “Creating learning scenarios, learning materials and presentations for lectures and exercises” and 47.1% ($M = 3.43$, $SD = 0.948$) “Creating exam questions, quizzes to assess students” are good possibilities. Only 33.3% ($M = 3.02$, $SD = 0.976$) agreed that “Providing personalized feedback and assistance to students” is possible. A high percentage of those unable to assess the applicability of these ChatGPT capabilities in training is reported.

The university professors also report possible negative results of using ChatGPT in teaching (Table 5).

The most severe problem for university professors is “Students can learn false, malicious or biased information if they rely entirely on ChatGPT without verifying the authenticity of what is written”—73.6% ($M = 4.02$, $SD = 0.902$). For 67.8% of respondents ($M = 4$, $SD = 0.952$) “Cheating by students in the preparation of academic texts” is a likely outcome, as well as “Plagiarism” (59.7%, $M = 3.68$, $SD = 0.982$). “Collection of personal data and sensitive information that can be misused” was a problem for 50.6% ($M = 3.57$, $SD = 0.996$) of respondents.

The statistical hypotheses for the presence or absence of a relationship/association between the variables were tested. No association was observed between university professors’ responses and their gender, age, professional field, or work experience.

4.3. Results Related to Research Question Three

The third research question is related to university professors’ attitudes about the application of ChatGPT in their teaching practice and the possible results they can achieve.

The university professors have a relatively positive attitude regarding the implementation of ChatGPT in their teaching practice ($M = 3.14$, $SD = 0.954$), with 41.4% of respondents answering agree or strongly agree (Figure 2). The share of university professors who cannot decide whether to apply this new technological tool in their teaching activity is relatively high (35.63%).

The research is also interested in what kind of teaching activities the university professors would use ChatGPT.

The frequencies (F), relative frequencies (%), means (M), and standard deviations (SD) of the responses to the questions are given in Tables 6 and 7.

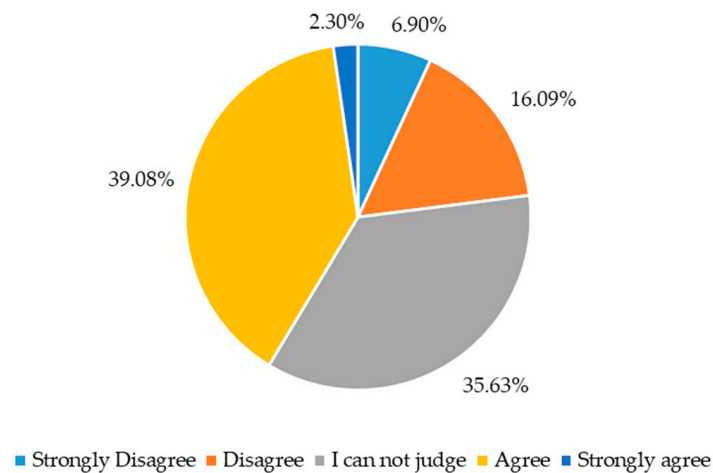


Figure 2. University professors' attitudes regarding the application of ChatGPT in their teaching activities.

Table 6. Purpose of using ChatGPT in teaching activities.

For what Would You Use ChatGPT in Your Teaching Activities?		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total	Mean	SD
To generate learning materials and presentations	F %	5 5.7	26 29.9	20 23	30 34.5	6 6.9	87 100	3.07	1.076
To create questions and quizzes to assess student knowledge	F %	6 6.9	19 21.8	23 26.4	34 39.1	5 5.7	87 100	3.15	1.051
To create practical exercises and tasks for students to complete	F %	6 6.9	19 21.8	22 25.3	34 39.1	6 6.9	87 100	3.17	1.07
To create exercises for students to correct and improve them	F %	5 5.7	15 17.2	23 26.4	37 42.5	7 8	87 100	3.3	1.036
To assess students and provide personalized feedback	F %	11 12.6	29 33.3	31 35.6	12 13.8	4 4.6	87 100	2.64	1.023

Table 7. The desired outcome of using ChatGPT in teaching activities.

For What Purpose Would You Use ChatGPT in Your Teaching Activities?		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total	Mean	SD
To provoke interest, activate and engage students	F %	5 5.7	11 12.6	19 21.8	40 46	12 13.8	87 100	3.49	1.066
To support activities that take more time	F %	3 3.4	11 12.6	20 23	39 44.8	14 16.1	87 100	3.57	1.019
To keep up with new technologies	F %	5 5.7	14 16.1	20 23	35 40.2	13 14.9	87 100	3.43	1.106
To provoke students' critical thinking and creativity	F %	7 8	12 13.8	27 31	28 32.2	13 14.9	87 100	3.32	1.136

The highest percentage of agreement was observed for the statement that ChatGPT is a good tool “To create exercises for students to correct and improve them” in the process of practical lessons—50.5% ($M = 3.3$, $SD = 1.036$). A total of 46% of university professors would use it “To create practical exercises and tasks for students to complete” ($M = 3.17$, $SD = 1.070$), 44.8%—“To create questions and quizzes to assess students' knowl-

edge” ($M = 3.15$, $SD = 1.051$) and 41.4%—“To generate learning materials and presentations” ($M = 3.07$, $SD = 1.076$). The lowest level of agreement (18.4%) corresponds to the statement “To assess students and provide personalized feedback” ($M = 2.64$, $SD = 1.023$).

The university professors also expressed opinions about their motivation for using ChatGPT in their teaching activities (Table 7).

The favorable agreement is observed on all statements, as the highest level of agreement corresponds to “To support activities that take more time”—60.9% ($M = 3.57$, $SD = 1.019$). A total of 59.8% of respondents agreed that ChatGPT can be used “To provoke interest, activate and engage students” ($M = 3.49$, $SD = 1.066$) and 47.1% ($M = 3.32$, $SD = 1.136$) “To provoke students’ critical thinking and creativity”. For 55.1% of university professors ($M = 3.43$, $SD = 1.106$) it is important “To keep up with new technologies”.

The statistical hypotheses for the presence or absence of a relationship/association between university professors’ responses and their gender, age, professional field, or work experience were tested.

As an alternative to the chi-square test, whose requirements were not considered to be valid, Fisher’s exact test was preferred. For datasets that require more computation time for the exact p -value to be calculated, the Monte Carlo method provided an unbiased estimate of the exact p -value that is reliable [30].

The Monte Carlo method revealed the existence of an association between the variable teaching experience and the university professors’ answers to the question “For what purpose would you use ChatGPT in your teaching activities?”

- “To keep up with new technologies”—the Monte Carlo estimate of the p -value is 0.010 with 99% confidence interval (lower bound—0.009 and upper bound—0.011). This estimate was based on 100,000 samples (Table 8).
- “To provoke the critical thinking and creativity of students”—the Monte Carlo estimate of the p -value is 0.001 with 99% confidence interval [0.001, 0.002]. This estimate was based on 100,000 samples (Table 9).

A more significant percentage of university professors with 21–25 years and 6–10 years of work experience agree that they should use AI applications (especially ChatGPT) in their teaching activities to keep up with new technologies, while those with 11–15 years of work experience do not express agreement or disagreement with this motivating force.

There is a difference in the degree of agreement between university professors with 21–25 years and over 30 years of work experience, who express agreement about the motive for using ChatGPT in their teaching activity to provoke students’ critical thinking and creativity, and those with 1–5 years and 16–20 years of work experience, where disagreement is more pronounced.

Table 8. An association between teaching experience and the statement “To keep up with new technologies”.

Chi-Square Tests						
	Value	df	Asymptotic Significance (Two-Sided)	Monte Carlo Sig. (Two-Sided)		
				Significance	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	45.884 ^a	28	0.018	0.016 ^b	0.015	0.017
Likelihood Ratio	47.974	28	0.011	0.022 ^b	0.021	0.024
Fisher’s Exact Test	38.849			0.010 ^b	0.009	0.011
N of Valid Cases	87					

^a 37 cells (92.5%) have expected count less than 5. The minimum expected count is 0.23. ^b Based on 100,000 sampled tables with starting seed 2000000.

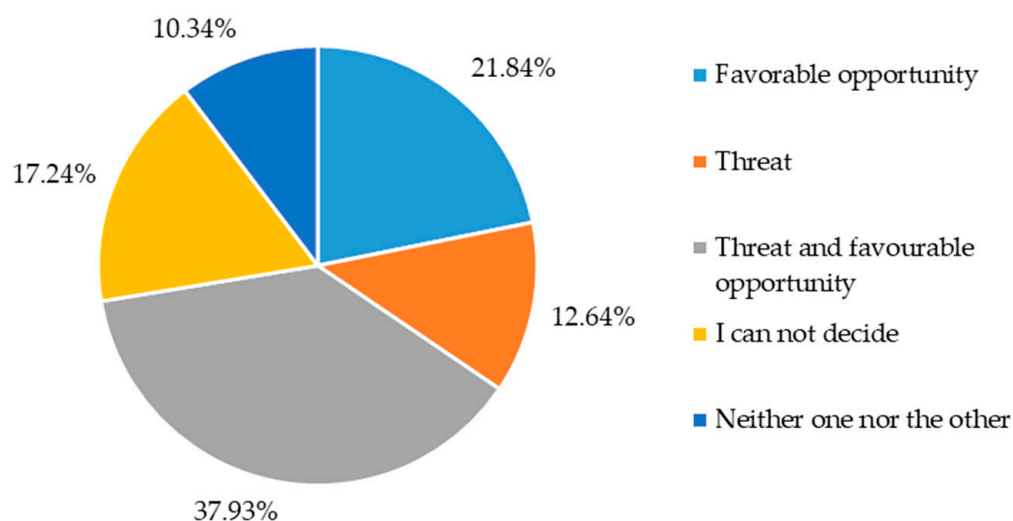
Table 9. An association between teaching experience and the statement “To provoke students’ critical thinking and creativity”.

Chi-Square Tests						
		df	Asymptotic Significance (2-Sided)	Monte Carlo Sig. (2-Sided) Significance	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	47.905 ^a	28	0.011	0.010 ^b	0.009	0.011
Likelihood Ratio	60.497	28	0.000	0.001 ^b	0.001	0.001
Fisher’s Exact Test	44.153			0.001 ^b	0.001	0.002
N of Valid Cases	87					

^a 37 cells (92.5%) have expected count less than 5. The minimum expected count is 0.32. ^b Based on 100,000 sampled tables with starting seed 1314643744.

The respondents were asked to give their opinion about AI chatbots—are they a threat or opportunity for educational institutions?

The results (Figure 3) show that 21.8% of university professors think that AI chatbots are a favorable opportunity while only 12.6% believe them to be a threat. With the highest relative proportion (37.9%), respondents considered them both a threat and a favorable opportunity. The respondents are aware of their positive and negative aspects. AI chatbots can become a threat or an opportunity depending on how they are applied in training. In summary, the university professors have a positive attitude but are still cautious in using them.

**Figure 3.** University professors’ opinion about ChatGPT as a threat or opportunity.

The question “Do you think ChatGPT should be studied for its proper use in education?” follows the logic of the previous one. It is necessary to reveal the best practices of the application of ChatGPT in education in order to avoid fraud, plagiarism, and all the risks and threats and to turn it into a valuable and applicable tool. ChatGPT should be studied to gain more experience and discover the most effective ways of its integration in training. This opinion is supported by most of the university professors (56.3% “Agree” and “Strongly Agree”—Figure 4).

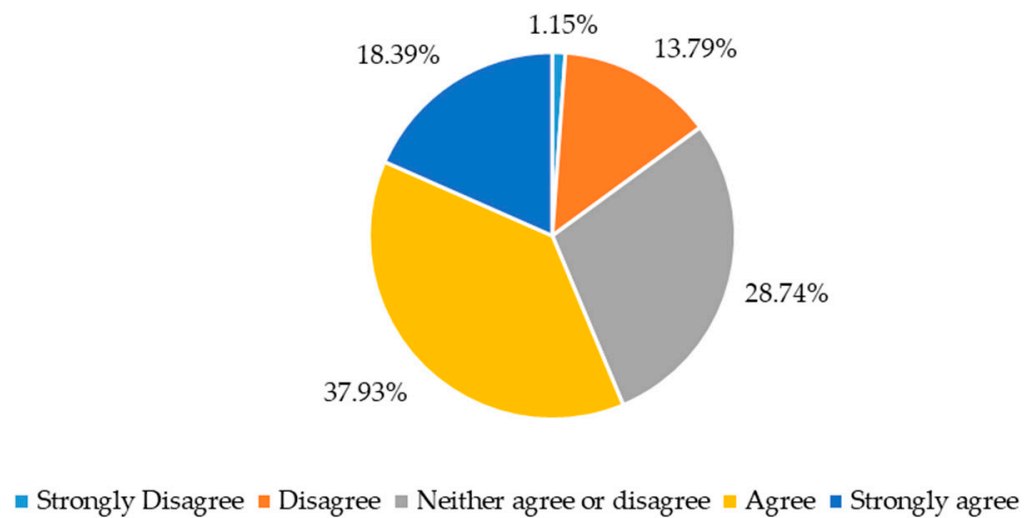


Figure 4. University professors' opinion about the need to study ChatGPT.

The Monte Carlo method revealed the existence of an association teaching experience and the university professors' responses to the question: Do you think ChatGPT should be studied for its proper use in education? The Monte Carlo estimate of the p -value is 0.007 with 99% confidence interval [0.006, 0.007]. This estimate was based on 100,000 samples (Table 10).

Table 10. Association between the teaching experience and university professors' responses to the question: "Do you think ChatGPT should be studied for its proper use in education?".

Chi-Square Tests						
		df	Asymptotic Significance (2-Sided)	Monte Carlo Sig. (2-Sided) Significance	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	48.727 ^a	28	0.009	0.014 ^b	0.013	0.015
Likelihood Ratio	48.699	28	0.009	0.005 ^b	0.005	0.006
Fisher's Exact Test	42.750			0.007 ^b	0.006	0.007
N of Valid Cases	87					

^a 37 cells (92.5%) have expected count less than 5. The minimum expected count is 0.05. ^b Based on 100,000 sampled tables with starting seed 1502173562.

The university professors between 1 and 5 years of experience think there is no need for ChatGPT to be studied, in contrast with those with experience between 16–20 and 21–25 years who have an opposite opinion (Figure 5).

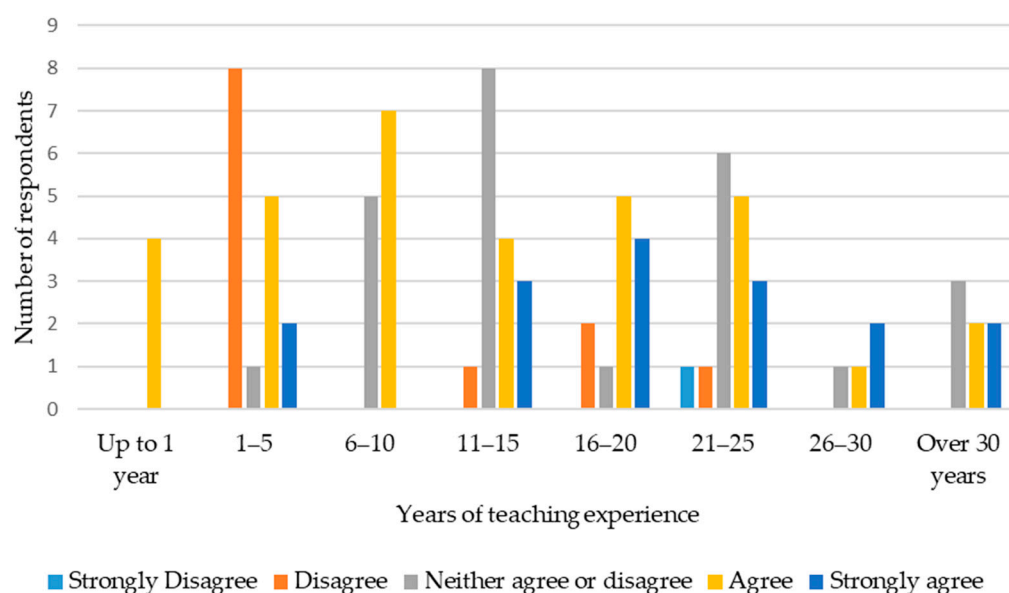


Figure 5. The necessity to study ChatGPT according to teaching experience.

5. Discussion

The study aimed to investigate university professors' attitudes toward the application of ChatGPT in education. The results are comparable to those of other studies on attitudes toward AI technologies.

A large proportion of university professors are familiar with AI applications and ChatGPT in particular, but there is still a large percentage who do not use it or use it infrequently and only when necessary.

From the current survey results, curiosity stands out as a leading motive for using ChatGPT, indicating that university professors are still exploring and investigating its possibilities. Idea generation and text writing were also presented as the primary motivations for its use and application in teaching, which is consistent with the finding of [29].

The principal opinion related to evaluating AI applications functionality is that they give partially correct or incorrect information, which coincides with the studies of [29] and [31] who commented on the reliability and correctness of the information provided by ChatGPT.

The current research findings are consistent with the existing studies, highlighting the potential benefits and challenges of integrating AI, such as ChatGPT, into education.

A positive attitude is observed toward the possibilities of ChatGPT for the creation of learning scenarios, learning materials, and presentations for lectures and practical lessons, as well as exam questions, quizzes, and assignments. This finding is supported by [15,32], who found that ChatGPT can be used to create lesson plans for specific subjects and generate topic-specific questions tailored to the subject and level of difficulty.

In the present study, a relatively low degree of agreement is reported regarding the possibilities of ChatGPT to provide personalized feedback and assistance to students, as well as a significant percentage of university professors who cannot take an unequivocal attitude. This is in contrast to other studies that report high levels of agreement with this statement. Immediate and personalized feedback has helped increase student engagement and motivation, leading to better academic performance [31,33]. In these studies, the authors note the role of ChatGPT in reducing the workload of teachers and enabling them to focus on more complex problems. One possible reason for this difference in opinions is that the respondents in the present study do not know the possibilities and do not use GAI tools to a sufficient extent.

The most severe concerns of university professors are related to the risk of Students learning false, malicious, or biased information if they rely entirely on ChatGPT without verifying the authenticity of what is written, which is consistent with [31], who found a

cide with those found in [31]. In contrast, [33] report a rather negative attitude toward ChatGPT—most participants in their study express no intention to use ChatGPT in the foreseeable future.

The university professors believe that ChatGPT can support activities that take more time by generating learning materials and presentations and creating quizzes to assess student knowledge and would integrate it into the learning process in these aspects. The respondents think that ChatGPT can provoke interest, activate and engage students, and stimulate students' critical thinking and creativity to achieve better results in learning. Ref. [36] highlighted that the area most negatively impacted by ChatGPT is the critical thinking of learners and problem-solving. This is in line with the university professors' desire to use ChatGPT for creating exercises and asking students to correct and improve them to provoke their critical thinking and creativity.

ChatGPT is a new tool, and its capabilities and impact on education are still being explored. The university professors are not yet familiar with it and cannot decide whether it would be a threat or a beneficial opportunity. There are concerns that AI will replace educators [37], but depending on how it is applied, it is possible to turn any threat into an opportunity. The majority of respondents of the current study consider ChatGPT as an opportunity, and its application in education would support their teaching activities, both in preparing materials and generating new ideas to make learners more active.

Findings of [34] show that the more educators are aware of GAI, the more they use it. Learning ChatGPT is critical to its proper use in education, and an association with years of working experience is apparent from the results obtained in our study. The university professors with more pedagogical experience felt that it is necessary to be familiar with this tool to keep up with new technologies and to implement them effectively in their professional field.

ChatGPT is already part of learners' daily lives. Educational institutions should accept it as a significant factor in learning and scientific research [25]. AI applications and ChatGPT should not be ignored or prohibited in educational institutions since it will backfire and increase learners' interest in their misuse. The correct approach is to regulate their use in the right way [23].

Inadequate knowledge of technology is at the root of the risks and fears of its introduction and integration in educational institutions [25]. For ethically and pedagogically effective use of these tools and their integration into learning in an appropriate and effective way, specific digital competencies are needed, both for students and educators [2,9].

6. Limitations of the Study and Future Research Direction

The present study has several limitations. First, there are limitations in terms of the sample, as the study was conducted in a single educational institution. Second, it should be taken into account that despite the introduction of ChatGPT and its use by users in Bulgaria, a wide range of discussions and research in the academic community is still limited. This is one of the reasons why some university professors cannot take a stand on the issues related to its use in education.

In order to fully understand the benefits and risks of implementing ChatGPT in education, learners' attitudes toward GAI should also be explored. Such a study would make it possible to compare students' and educators' attitudes toward ChatGPT and find intersections as well as differences.

Similar studies can support educational institutions in fulfilling their new role in the technological society. The institutional policy should be aimed at developing strategies for the ethical and professional use of GAI and organizing training programs for the formation of new digital competencies.

7. Conclusions

AI applications, including ChatGPT, are already part of society's daily life and are intensively used by learners in learning activities.

The results of the current study show that ChatGPT has the potential to support teaching and learning. As a GAI, ChatGPT can facilitate university professors' activities and reduce their burden by systematizing information sources, generating ideas and creating learning scenarios and plans, and learning and exam materials, tailored to the learners' level of knowledge. At the same time, the possible risks of its unbalanced and unethical use by users cannot be ignored. The most severe problems are guaranteeing the credibility of the generated texts, which can negatively affect the assimilation of knowledge and skills, the validity of assessment practices, and risks to data confidentiality and security.

The benefits of tools such as ChatGPT highlight the potential capabilities of artificial intelligence for learning, and challenges indicate the need to explore ways to effectively integrate them into teaching and learning [4].

The current research results show that university professors use artificial intelligence applications in their daily activities, including ChatGPT, and have a positive attitude to its application in their teaching activities. They perceive ChatGPT as a means to support time-consuming teaching activities, provoke interest, activate and engage students, and stimulate their critical thinking and creativity. The university professors considered GAI applications as both—a threat and a favorable opportunity. A significant proportion of university professors cannot yet assess the possibilities and risks of its use. One of the reasons is the insufficient knowledge of the principles of functioning of such generative tools and university professors, who are adamant that it must be studied to be used properly.

In order to implement an effective learning process and overcome the challenges, it is necessary to form new digital competencies for using artificial intelligence applications in both students and university professors. Educational institutions should develop strategies and training programs for the productive and effective use of generative tools for educational purposes.

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