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A global triangulation approach to ChatGPT integration in education

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Abstract. This study investigated the utilization of ChatGPT in education through a data triangulation methodology that analyzed the perspectives of artificial intelligence experts, researchers, educators, and students. The objective was to construct a comprehensive understanding of the role of emerging AI technology in the educational context. A total of 16 artificial intelligence experts, 5 researchers, 9 educators, and 14 students from 13 countries were consulted for this study, and the analysis yielded both consensus points and divergent insights among the different groups. This study revealed a shared recognition of ChatGPT's potential benefits in enhancing productivity, providing resources, and facilitating homework and research tasks. However, the analysis also identified common concerns, including issues related to academic dishonesty, accuracy, and the impact on learning motivation and traditional pedagogy. Additionally, a consensus emerged on the necessity of adapting the education system for responsible AI integration with an emphasis on preparing students and educators for the future by addressing AI's limitations and ethical implications. Significant insights emerged from each group: AI experts emphasized the necessity for responsibility and guidance in the utilization of AI tools, highlighting limitations in understanding and response accuracy, stressing the need for educational strategies to regulate ChatGPT usage; educators expressed concerns about AI replacing humans in education, emphasizing adapting pedagogical methods, and students raised ethical concerns, particularly about academic dishonesty and the impact of AI on creativity and ethics. These findings support the development of targeted integration strategies for ChatGPT in educational contexts, underscoring the importance of considering both shared and individual stakeholder perspectives in this regard.

Keywords: ChatGPT, AI in education, integration strategies

1. Introduction

Although many artificial intelligence platforms have emerged, including DeepSeek, Claude, Google Gemini, and Perplexity, ChatGPT has the advantage of being the first to integrate education. ChatGPT (Chat Generative Pre-trained Transformer) is a sophisticated chatbot developed by OpenAI that uses natural language processing to generate human-like responses to user inputs [25]. ChatGPT initially elicited concerns in education because of its potential to facilitate academic dishonesty [31]. Notably, prominent educational technology (ed-tech) companies such as Duolingo and Quizlet have integrated this chatbot into their platforms. Despite its controversial reception, some educators have utilized ChatGPT for academic assignments, shifting the emphasis from factual recall to critical thinking and analytical skills. There is increasing recognition of the potential of ChatGPT to enhance educational experiences. This advanced tool can function as an effective classroom assistant, augment interactivity, foster media literacy, develop customized lesson plans, and alleviate teachers' administrative burdens [11, 34]. Recent studies have highlighted its ability to generate

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personalized instructional content and promote media literacy [13, 22]. However, concerns regarding its misuse, particularly in the context of academic dishonesty, persist, emphasizing the necessity of pragmatic guidelines to govern its implementation in educational settings.

Since its public release on November 30, 2022, ChatGPT has rapidly become one of the most swiftly adopted technologies in history, amassing 1 million users within five days and eventually reaching 100 million daily users with a 14% bounce rate [8], an ascent unparalleled by any other. The first quarter of 2023 witnessed a surge in interest in AI technologies, outpacing other technology sectors [8]. As of March 2025, ChatGPT operates on three models: GPT-4.5 (Orion), OpenAI o3 and OpenAI o3-mini. Competitors in the AI application sector, including Google Gemini, Claude, Perplexity AI, Jasper AI, and Midjourney has also attracted interest in educational settings.

ChatGPT is an advanced artificial intelligence chatbot developed by OpenAI uses natural language processing to engage users in conversational interactions [9]. ChatGPT, classified under the category of Narrow AI and more specifically under the umbrella of Natural Language Processing (NLP), is indicative of the capacity of machines to comprehend, interpret, and engage with human language in meaningful and context-relevant ways. Powered by machine learning algorithms trained on extensive datasets, ChatGPT leverages the transformer framework, which is adept at managing diverse language-based tasks. Its proficiency makes it a versatile tool for educational applications, ranging from personalized learning experiences in administrative support.

The emergence of ChatGPT has catalyzed the proliferation of numerous AI tools, including Jasper, Grok, and Microsoft Copilot, which are rapidly developing. As AI technologies advance, their integration and application in educational contexts have become paramount for educators and students. Consequently, the discourse surrounding AI in education extends beyond that of ChatGPT. The evolving nature of AI is poised to exert a substantial influence on educational paradigms. Therefore, it is vital to understand and analyze the perspectives of all stakeholders regarding the role of AI in education. This understanding is essential and critical for future research and development in this domain.

The theoretical framework of this study is based on the Technology Acceptance Model (TAM) developed by Davis [7]. TAM explains individuals' attitudes and behaviours towards new technologies through two basic concepts: perceived usefulness and perceived ease of use. When it comes to the use of artificial intelligence tools such as ChatGPT in education, teachers' and students' adoption or rejection of this technology depends on their perceptions of the academic benefits offered by the technology and how easy and smooth it is to use. In this context, TAM provides a theoretical basis for identifying the critical factors that influence users' intentions and behaviours towards technology.

Recent global reports from UNESCO, OECD, and the European Commission emphasize the importance of considering the acceptance and integration of AI applications in education within the TAM framework. For example, UNESCO's "Guidance for Generative AI in Education and Research" emphasizes that the successful integration of AI in education is closely related to the factors of perceived usefulness and ease of use [17]. Therefore, this study aims to determine the necessary conditions and strategies for the effective and sustainable integration of artificial intelligence tools into the education system by examining the perceptions of educational stakeholders regarding the use of ChatGPT in TAM education.

2. Literature review

The integration of ChatGPT into educational environments, its capabilities, application areas, and challenges encountered in this process have been the subjects of many studies in recent years [16, 28]. Large language models exhibit significant potential in areas such as the preparation of educational content, increase in student engagement, and personalization of learning experiences [13, 19]. However, teachers and students should be made aware of the limitations and biases of these technologies [19]. Kutlucan and Seferoğlu [24] evaluated the effects of ChatGPT on educational processes using SWOT and PEST analyses. This research highlights the strengths of ChatGPT, such as accessibility and efficiency, as well as its weaknesses, such as ethical concerns and inequalities in technological access. The authors emphasize the importance of strategic policy development to ensure the effective and ethical use of ChatGPT in education.

Recent studies have indicated a marked increase in the number of studies examining the educational use of ChatGPT across diverse academic disciplines. Lo [28] revealed that the efficacy of ChatGPT in various subject areas is inconsistent. This technology can function as an assistive tool for educators and as a virtual instructor for students. Nevertheless, concerns regarding the production of false information and the circumvention of plagiarism detection systems have been highlighted as limitations of this technology. In the field of medical education, particularly in the context of the United States Medical Licensing Examination (USMLE), Kung et al. [23] underscored the potential benefits of ChatGPT, asserting that it could facilitate medical education and enhance clinical decision-making processes. In the domain of programming education, Wollowski [41] assessed ChatGPT's capacity to generate code and observed that the code produced by this tool often deviates from the established style guidelines. This study suggests that traditional textbooks may be more effective for programming learning.

Adeshola and Adepoju [1] comprehensively analyzed the opportunities and challenges presented by ChatGPT in education. Their study revealed that ChatGPT offers beneficial contributions to students, including personalized learning experiences, enhanced access to information, and research support. However, it also poses potential risks to critical aspects such as academic integrity, critical thinking skills and ethical conduct. These findings indicate that ChatGPT should be conceptualized not merely as a technological tool but as an innovation requiring careful implementation under pedagogical guidance within the educational framework. In this study, employing a similar methodological approach, the perspectives of diverse stakeholder groups (AI experts, researchers, educators, and students) regarding ChatGPT integration were examined using triangulation methodology.

As anticipated, the integration of ChatGPT into coding and programming education is progressing rapidly. Popovici [36] conducted a study to ascertain the capabilities and constraints of ChatGPT in functional programming courses. The study concluded that ChatGPT produced 68% accurate responses in code generation and debugging, although only 50% of these responses were beneficial to students. Additionally, this study determined that ChatGPT exhibited a high degree of proficiency in conducting code reviews for student assignments. The author discusses the advantages and disadvantages of integrating ChatGPT into educational settings, suggesting careful consideration of its integration with traditional teaching methods.

The various applications of ChatGPT in classrooms present both challenges and opportunities. Munawar and Misirlis [33] investigated how this technology could transform challenges in education into opportunities by examining its application in classrooms. The study asserts that ChatGPT has the potential to offer personalized

learning experiences; however, it also poses issues such as cheating, misinformation, and difficulties in integrating it into teachers' course designs. By evaluating teachers' and students' attitudes towards ChatGPT, Munawar and Misirlis [33] suggested strategies for the effective incorporation of this technology into educational processes. Bitzenbauer [2] examined the applications of ChatGPT for physics education at the high school level in a pilot study conducted with students and found that ChatGPT positively affected students' perceptions and increased classroom interactions. Similarly, Kim et al. [21] emphasized the potential of ChatGPT to enhance student interactions in computer-supported collaborative learning environments but stressed the necessity for a meticulous evaluation process.

AI-based educational tools play an important role in reshaping educational environments. The benefits and limitations of ChatGPT and similar tools in educational processes have been examined across different disciplines and teaching levels. For example, Kasneci et al. [19] demonstrated the potential of large language models (LLMs) to increase student engagement, provide personalized learning environments, and reduce the teacher's burden. In contrast, a quick literature review by Lo [28] suggests that the impact of ChatGPT on education is inconsistent across disciplines, supporting learning in some areas while having limitations in others, particularly in language-sensitive areas. Similarly, Wollowski [41] analyzed the impact of ChatGPT on coding and software education and emphasized that the content provided by these tools is often far from standard and that students cannot sufficiently develop their coding skills. Furthermore, Kutlucan and Seferoğlu [24], using SWOT and PEST analyses, argue that ChatGPT has both advantages and challenges in critical issues such as ethics, accessibility, and equal opportunity in education, and argue for more strategic approaches in educational policies. These studies highlight the importance of comprehensively addressing the potential and limitations of ChatGPT in education.

From a broad thematic perspective, the integration of ChatGPT into education can be regarded as having multiple facets [11]. The study identified nine significant themes pertaining to the integration of artificial intelligence in education, including the evolution of education systems, changes in teacher roles, effects on evaluation processes, ethical concerns, and digital literacy. In a similar vein, Mao, Chen and Liu [29] contended that artificial intelligence would profoundly impact education and assessment processes, emphasizing the necessity for novel assessment methods to be designed within this context. Su and Yang [39] further asserted that tools such as ChatGPT can offer students more personalized learning opportunities; however, they identified issues pertaining to data quality and ethical security as potential challenges that must be addressed.

3. Current investigation

This study aimed to collate and analyze a rich, multifaceted perspective on the application of ChatGPT in education, drawing insights from AI experts, researchers, teachers and students. By synthesizing these diverse viewpoints, this study seeks to construct a comprehensive understanding of this emerging issue and derive practical insights into the integration of ChatGPT into educational environments, considering both its positive and negative implications. The research questions guiding this study were as follows:

1. How do AI experts, researchers, teachers, and students perceive the use of ChatGPT in education, and what are the convergences and divergences in their perspectives?
2. What integration strategies can be developed and recommended for the effective integration of ChatGPT into educational practices based on the collective insights

of AI experts, researchers, teachers and students?

4. Method

This study was designed as phenomenological research to examine the experiences and perceptions of different stakeholders regarding the use of ChatGPT in education. Phenomenology is a qualitative research method that aims to explore participants' subjective experiences of a particular phenomenon [40]. Phenomenology is a method that aims to gain an in-depth understanding of individuals' subjective experiences of a particular phenomenon [6]. In the context of this research, a descriptive phenomenological approach was preferred to explore the personal experiences and perceptions of stakeholders regarding the use of ChatGPT in educational settings. Descriptive phenomenology aims to reveal participants' experiences objectively and without prejudice [15].

In this study, we adopted a data triangulation methodology, drawing insights from a diverse range of sources to ensure a robust and multifaceted analysis of the application of ChatGPT in education. Data were collected from four groups – AI experts, researchers, teachers, and students – through responses to open-ended questions posted on Twitter and educational technology blogs. This approach allowed us to capture a broad spectrum of perspectives and facilitate a comprehensive understanding of the topic [12]. By comparing and contrasting viewpoints from these sources, we ensured the reliability and depth of our findings while acknowledging the inherent limitations of selection bias in our data collection methods.

The data for this study were collected through a straightforward query: "What do you think about the use of ChatGPT in Education?" This question was posed as a public tweet on X (Twitter) and embedded in the Comments section of blog posts. The choice of these platforms was driven by the desire to gather candid and interactive opinions on the dynamic nature of AI. Using Web 2.0 platforms, such as X and blogs, allows participants to articulate their views more freely and interactively, a methodological approach supported by Snee [38] and others. To ensure a comprehensive spectrum of perspectives on the use of ChatGPT in education, the following groups were targeted: AI experts, students, teachers and researchers. Data were collected from 16 artificial intelligence experts, 5 researchers, 9 educators, and 14 students from 13 countries. The data collection phase spanned from February to April 2023 and involved 40 participants. The demographic details of these participants are summarized in table 1, categorized by country, group, sex, and the number of participants.

As indicated in table 1, the participants hailed from 13 different countries: the United Kingdom, India, Spain, the United States, Thailand, Finland, Turkey, Poland, the Philippines, Bulgaria, Taiwan, Israel, and Belgium. Participant profiles were used to gather demographic data. The participants included AI experts (n=14), students (n=14), teachers (n=8), and researchers (n=5). The majority of the participants were male (n=22), with 19 female participants. AI experts came from various sectors, such as gaming, chatbot development, and prompt engineering. The student participants were undergraduate and graduate students interested in e-learning and AI. The researchers were scholars in educational technology, while the teacher group comprised primary and secondary school educators.

Qualitative content analysis was used as the analytical approach. Initially, the participants' responses were compiled and transferred to MS Excel and subsequently to NVivo. MS Excel facilitated the preliminary organization and categorization of the data, whereas NVivo was used for the thematic coding and comprehensive qualitative content analysis. This analysis adhered to the established steps of qualitative content analysis, as delineated by Mayring [30]. Initially, the dataset was examined to identify

Table 1
Demographic information of participants.

Country	Group	Gender	Number of participants
UK	AI experts	Male	4
India	AI experts	Male	2
Spain	AI experts	Male	1
US	AI experts	Male	5
Thailand	AI experts	Female	1
Finland	AI experts	Female	1
Turkey	AI experts	Male	1
Poland	AI experts	Male	1
Philippines	Student	Female	1
US	Student	Male	4
US	Student	Female	4
Bulgaria	Student	Male	1
Bulgaria	Student	Female	1
Taiwan	Student	Female	2
Israel	Student	Male	1
Israel	Student	Female	2
US	Teacher	Male	5
US	Teacher	Female	2
Taiwan	Teacher	Male	1
Bulgaria	Teacher	Female	1
US	Researcher	Female	1
Taiwan	Researcher	Male	1
Taiwan	Researcher	Female	1
Belgium	Researcher	Female	2

salient points, which were subsequently categorized into overarching themes and subthemes. This classification was conducted based on the themes and codes that emerged prominently in the dataset, which aligned with the objectives of the study [27]. The derived themes and codes formed the foundation of the study's results and discussions. Qualitative content analysis provides a nuanced understanding and interpretation of participants' perspectives, aligning them with the goals of the study [30].

To ensure the validity and reliability of the study, data triangulation was conducted to compare the data obtained from different stakeholder groups, and the coding process was carried out independently by two coders to ensure the reliability of the results [5]. In this study, two independent coders initially analyzed the qualitative data separately using NVivo and Excel software. Subsequent to this independent coding phase, the coders convened to compare their results and deliberate on any discrepancies. Through deliberation, they resolved the differences and achieved a consensus on the final coding scheme. This process ensured the rigorous application of our coding framework and enhanced the reliability of our qualitative analysis [26]. The inductive content analysis method was preferred for analyzing the collected qualitative data. The analysis was conducted in accordance with the steps specified by Mayring [30]. In the first stage, raw data were read, and preliminary codes were created. Similar codes were then grouped to form categories and themes. To ensure the reliability of the coding, Cohen's kappa agreement was calculated (96%) to ensure consistency between the codes. The coding and data analysis processes were supported using NVivo software.

The study complied with ethical standards. Before the research, the purpose of the research was clearly stated to the participants, participation was ensured on

a voluntary basis, and it was guaranteed that the data would be kept anonymous and confidential. The ethical guidelines outlined by the Committee on Publication Ethics (COPE) were strictly adhered to throughout the study. The primary ethical consideration was the protection of the participant's privacy. Consequently, the participants' names were omitted from the article. The use of online platforms for data collection facilitated more candid self-expression by the participants, as observed in previous studies [18, 20].

5. Findings

The findings of this study were derived from a qualitative content analysis of collected data. Initially, the perspectives of each participant group were presented under distinct headings, followed by an integrated synthesis of qualitative insights from the four groups.

5.1. Views of AI experts

The related codes within each theme were representative of the opinions and perspectives found in the qualitative data. The frequencies indicate the number of times a specific code appears in the dataset. The themes and codes regarding AI experts' views on the "Use of ChatGPT in education" are presented in table 2.

Table 2
AI experts' views.

Themes	Codes	Frequency (f)	Percentage (%)
AI as a tool in education	Basic knowledge and skills	4	25
	Resources for students to refer to	4	25
	Responsibility and guidance	2	12.5
Homework and assessment	The nature of homework	4	25
	Student performance	1	6.25
Education system and policies	Education system change	2	12.5
	Parental involvement	1	6.25

Analysis of AI experts' opinions on the "Use of ChatGPT in education" yielded three primary themes: "AI as a tool in education" (f=10), "Homework and assessment" (f=5), and "Education system and policies" (f=3). Under "AI as a Tool in Education," most AI experts stressed the necessity for students to acquire basic knowledge and skills (f=4), the importance of AI tools as reference resources (f=4), and the pivotal role of teachers in guiding and shouldering responsibilities (f=2). The "Homework and assessment" theme highlighted the need to transform homework practices (f=4) and to focus more on evaluating student performance rather than homework (f=1). The "Education system and policies" theme centred on the need for systemic changes in education (f=2) and the crucial role of parental involvement in homework (f=1).

AI experts commonly view ChatGPT as a component of broader AI applications in education, which is useful for imparting basic knowledge and skills under the careful guidance of an educator. They underscore the necessity of revamping traditional educational methods, including homework, and the overall education system itself. A representative quote from an AI expert's response is presented below.

> … it's a tool like everything else – we need to educate our children the good and bad for each new technology (UK, AI expert 2)

5.2. Views of researchers

The themes and codes regarding researchers' views on the "Use of ChatGPT in education" are presented in table 3.

Table 3
Researchers' views.

Themes	Codes	Frequency (*f*)	Percentage (%)
ChatGPT benefits	Productivity and effectiveness	3	60
	Access to knowledge	2	40
	Creativity and innovation	2	40
ChatGPT limitations	Understanding and response accuracy	3	60
	Lack of up-to-date knowledge	1	20
	Idioms and language features	1	20
Education strategies	Regulating ChatGPT usage	4	80
	Adaptation of teachers and students	2	40

Researchers' perspectives on the "Use of ChatGPT in education" are categorized into three main themes: "ChatGPT benefits" (f=7), "Education strategies" (f=6), and "ChatGPT limitations" (f=5). Under "ChatGPT benefits", researchers highlighted ChatGPT's contributions to productivity, effectiveness (f=3), knowledge accessibility (f=2), and fostering creativity and innovation (f=2). The "Education strategies" theme encompassed opinions on regulating ChatGPT usage (f=4) and adapting teaching and learning methods to this technology (f=2). In discussing "ChatGPT limitations", the researchers pointed out issues with understanding and response accuracy (f=3), outdated knowledge (f=1), and difficulties in handling idioms and language nuances (f=1).

Researchers generally acknowledge ChatGPT's benefits in enhancing educational productivity, effectiveness, and access to information while also noting its limitations. They emphasized the development of educational strategies to regulate the use of ChatGPT and facilitate the smooth adaptation of educators and students to AI tools. A direct quote from the researcher's opinion is presented below.

> ... ChatGPT can help students acquire the information they need more efficiently and accurately. ... artificial Intelligence such as Chatgpt, New Bing, are revolutionizing the way we work, and this trend does not seem to stop. Microsoft released "Microsoft 365 Copliot", an A.I. that aims to improve productivity. Therefore, I think teachers or the students themselves should learn how to "utilize" A.I. to achieve their goals, whether they are assignments or science projects (Taiwan, Researcher 2)

Both AI experts and researchers have recognized the potential and limitations of ChatGPT in education settings. They agreed on the importance of devising effective educational strategies, adapting teaching and learning methods to AI tools, and revising traditional educational practices and systems to accommodate AI.

5.3. Views of teachers

The themes, codes, and frequencies derived from the teachers' views are presented in table 4.

The teachers' perspectives, as gleaned from the content analysis, are organized under four themes: "AI Negative effects" (f=9), "AI reliability" (f=6), "AI integration" (f=6), and "AI benefits" (f=4). Teachers expressed apprehensions about ChatGPT's influence on student learning and its potential for misuse, particularly concerns that

Table 4
Educators' views.

Themes	Codes	Frequency (f)	Percentage (%)
AI negative effects	Laziness/cheating	6	67
	Decreasing learning desire	2	22
	Affecting traditional education	1	11
AI reliability	Accuracy concerns	3	33
	Replacing human teachers	3	33
AI integration	Adapting teaching methods	4	44
	New task types	2	22
AI benefits	Support for students	3	33
	Efficiency for teachers	1	11

AI tools might induce laziness, promote cheating, and diminish students' desire to learn (f=6). Additionally, doubts about the reliability of the information provided by ChatGPT were raised (f=3), with some teachers questioning the tool's ability to match human teacher reliability (f=3). The "AI integration" theme emerged as a proposed solution, advocating for the adaptation of teaching methods and the definition of new tasks to better integrate AI tools such as ChatGPT into the educational process (f=3). Moreover, some teachers recognized the potential benefits of ChatGPT in supporting students who struggle to enhance their efficiency.

Teachers' views on ChatGPT's use in education vary, with concerns primarily centred on its impact on student learning and potential misuse. However, if used responsibly, AI tools can be effectively integrated into educational processes. This sentiment aligns with the emphasis placed by researchers on educational strategies. A representative quote from a teacher's response is provided below.

> Taking everything into account, I truly believe that with the right approach, Open AI sources such as Chat GPT can be used as a learning and teaching tool rather than being deemed as a tool created to diminish the importance of pure and direct learning (Bulgaria, Teacher 6)

5.4. Views of students

The themes and codes resulting from the content analysis of the students' views are presented in table 5.

Student perspectives on ChatGPT's use in education, as derived from content analysis, were categorized under the themes: "Benefits" (f=20), "AI integration" (f=10), "Ethics" (f=10), and "Limitations" (f=7). Students largely perceived ChatGPT as beneficial for homework assistance (f=7), inspiration, writing and research. Some have noted its utility in coding and as a substitute for private tutoring. The "AI integration" theme reflected students' preference for responsible adoption and usage of AI in education over outright bans or restrictions (f=10). They also acknowledged the significant future role of AI in education. However, concerns about the potential of ChatGPT as a cheating tool (f=7) and its impact on student creativity and work ethics were expressed. The limitations cited included occasional incorrect responses (f=5), limited language skills (f=1), and shallow knowledge of specific subject areas (f=1). Direct quotes from each student's response are presented below.

> In my own experiences with Chat GPT I have found it to be a very useful tool for research purposes, … as a tool it is very helpful for students, and although it can be used as a cheating device (US, Student 4)

Table 5
Students' views.

Themes	Codes	Frequency (*f*)	Percentage (%)
Benefits	Useful for homework	7	50
	Doing research	2	14
	Inspiration for ideas	3	21
	Writing help	5	36
	Coding help	2	14
	Can replace private lessons	1	7
Limitations	Incorrect answers	5	36
	Limited language skills	1	7
	Lack of deep knowledge	1	7
Ethics	Cheating concerns	7	50
	Effect on creativity/work ethic	3	21
AI integration	Adopting AI in education	4	29
	AI in the future	3	21
	Learning to use AI responsibly	3	21

Students' views on ChatGPT in education are mixed. They recognize its benefits for various educational purposes but also voice concerns about ethical issues and limitations. However, many agree that adopting AI in education and learning to use it responsibly is preferable to completely restricting access to AI tools such as ChatGPT. They also emphasize the importance of adapting to AI's evolving role in education.

5.5. Integration of perspectives

The results of an in-depth analysis of the views of the four groups regarding the use of ChatGPT in education are provided in the previous sections. These views were categorized into themes and codes. This section integrates the findings from AI experts, researchers, teachers, and students, identifying the overarching consensus points and unique insights specific to each group. The views of AI experts, researchers, teachers, and students can be categorized into two categories: consensus and unique insights. *Consensus* points are:

- All groups recognized the benefits of ChatGPT in enhancing productivity, providing resources, and aiding homework and research.
- Concerns about cheating, accuracy, and the impact on learning desire and traditional teaching methods were prevalent across groups.
- There is a consensus on the need to adapt the education system and integrate AI responsibly.
- Preparing students and teachers for the future involves not only leveraging AI's benefits of AI but also addressing its limitations and ethical implications.

In addition to the consensus on the use of ChatGPT in education, there were unique insights from these groups. AI experts should focus on the need for responsibility and guidance when using AI tools. *Unique insights* are:

- Researchers have highlighted the limitations of understanding and response accuracy and the need for educational strategies to regulate ChatGPT usage.
- Teachers have expressed concerns about AI replacing the human elements in education and emphasized the need to adapt teaching methods.
- Students are concerned about ethics, specifically cheating, and how AI affects creativity and work ethics.

To synthesize the diverse perspectives of artificial intelligence experts, researchers, educators, and students regarding the utilization of ChatGPT in educational contexts, a network map was created (see figure 1). Figure 1 illustrates the consensus across groups and the unique contributions of each stakeholder. This network representation reinforces the rationale for employing a triangulation approach in our study, as it clearly delineates how overlapping and distinct perspectives collectively inform our understanding of the role of ChatGPT in education.

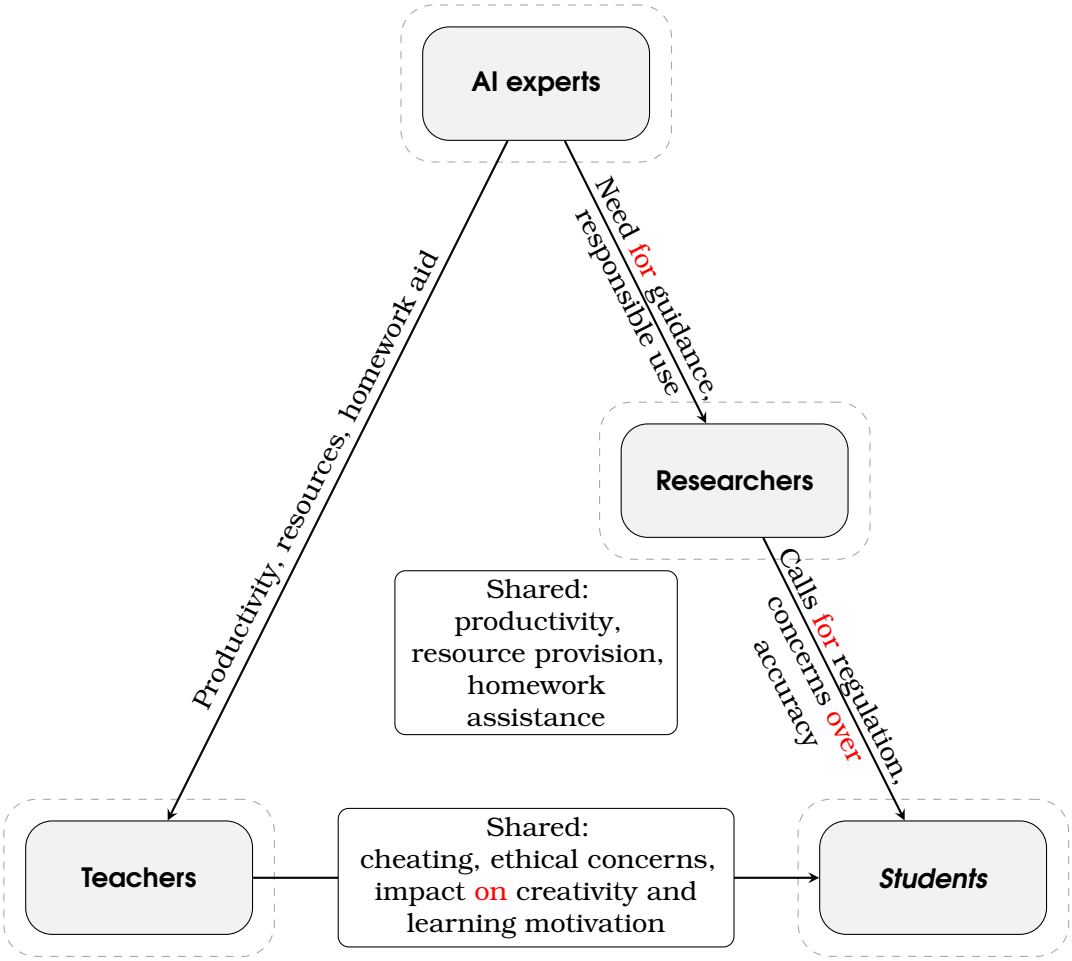

Figure 1: Network map of stakeholder perspectives.

Figure 1 presents a network diagram in which each node represents one of the four participant groups: AI experts, Researchers, Teachers, and Students. The edges connecting these nodes denote recurring codes (shared themes) identified through the qualitative content analysis. The edge between the AI experts and Researchers nodes encompasses themes related to the advantages of ChatGPT, including enhanced productivity, improved resource provision, and its utility in facilitating homework and research. The connection between Researchers and Teachers is characterized by a consensus on the necessity for robust strategies to regulate ChatGPT usage alongside shared concerns regarding reliability and the impact on traditional pedagogical practices. Similarly, the edge linking Teachers and Students reflects overlapping perspectives concerning academic integrity and ethical considerations; both groups express apprehensions regarding issues such as academic dishonesty and potential adverse effects on creativity and authentic learning processes. The network map illustrates that while each stakeholder group offers unique insights, recurring codes consistently serve as the connective elements that unite their perspectives. This com-

prehensive representation underscores the multifaceted nature of ChatGPT integration in educational settings and reinforces the value of employing a triangulated approach to capture the complexity of stakeholder experiences.

A comparative analysis of the views of different stakeholder groups revealed commonalities and significant differences. AI experts and researchers similarly see a positive potential for the integration of ChatGPT into education while emphasizing the limitations and ethical use of these tools. In contrast, teachers are more cautious about the integration of AI into classroom processes, drawing more attention to concerns such as student demotivation and academic integrity. Students, on the other hand, found ChatGPT useful in general but frequently mentioned the importance of ethical use and the need for responsibility. These differences and commonalities reveal that the role of artificial intelligence tools in education should be evaluated using a multidimensional and stakeholder-oriented approach.

6. Discussion

This study delves into the perspectives of AI experts, researchers, teachers, and students regarding ChatGPT's utilization in educational settings. Through qualitative content analysis, significant insights emerged that can be categorized into four overarching themes: benefits, challenges, integration strategies, and ethical concerns. These insights align with the existing literature, offering a comprehensive understanding of the advantages and limitations of using large language models such as GPT in the educational realm.

AI experts and researchers have highlighted the merits of ChatGPT in education, including enhancing students' fundamental knowledge and skills, providing better access to resources, boosting productivity, and fostering creativity and innovation. Teachers recognize the potential benefits of AI, such as its ability to support students who struggle and improve teaching efficiency. Students perceived ChatGPT as beneficial for assignments, inspiration, writing assistance, research, and coding. Positive outcomes, such as facilitating educational content creation, boosting student engagement, and personalizing learning experiences, resonate with the findings of Kasneci et al. [19]. The advantages observed in this study, such as offering personalized and efficient learning experiences and quicker feedback for teachers, support those reported by the author [11] and Su and Yang [39]. However, these studies also point to challenges, including unproven effectiveness, data quality limitations, and ethical concerns.

The limitations of ChatGPT noted by researchers include issues with understanding and response accuracy, outdated information, and challenges in handling idioms and linguistic nuances. Teachers expressed apprehension about AI's potential to disrupt traditional teaching methods and questioned the reliability of the information provided by ChatGPT. Students, on the other hand, pointed out problems such as occasional inaccuracies, limited language capabilities, and a lack of in-depth knowledge of certain subjects. These concerns align with the findings of Kasneci et al. [19], who stressed the need for teachers and students to understand the limitations and vulnerabilities of large language models. Additionally, studies by Lo [28] and Wollowski [41] indicate that ChatGPT's performance varies across subjects and may struggle with tasks such as code generation, underscoring issues such as generating incorrect information and evading plagiarism detection systems.

AI experts, researchers, and teachers have suggested regulating the use of ChatGPT and advocating for adapting teaching methods to integrate it effectively into educational practices. Students have called for embracing AI in education instead of outright bans or restrictions on tools such as ChatGPT. Research in specific fields, such as medical

education and secondary school physics [2, 23], demonstrates ChatGPT's potential to enhance learning experiences and aid teachers, provided that its limitations and biases are acknowledged.

Similar to the study by Adeshola and Adepoju [1], this research, while emphasizing the potential benefits of ChatGPT in education, elucidate the ethical and practical issues that arise. Specifically, educators' and students' concerns regarding the development of critical thinking skills and the maintenance of academic integrity, in light of the conveniences offered by ChatGPT, suggest that a strategic approach should accompany the implementation of this technology in educational settings.

The findings of this study show significant similarities and differences when compared with those of studies in the existing literature. In parallel with Kasneci et al. [19], our participants stated that ChatGPT offers personalized learning opportunities in educational processes and can lighten the workload of teachers. However, the interdisciplinary inconsistencies identified by Lo [28] were also observed in our findings, and significant concerns were expressed, particularly regarding language sensitivity and accuracy issues. The academic honesty concerns emphasized by teachers and students' concerns about ethics are in line with Adeshola and Adepoju [1]. However, in our study, students' positive evaluation of ChatGPT's contribution to coding education differed from the more critical findings of Wollowski [41]. This comparative analysis reveals the diversity of stakeholders' perspectives on the integration of AI in education and suggests that these differences need to be examined in more depth.

Teachers and students have voiced concerns about AI tools fostering laziness, plagiarism, and diminishing learning motivation. These groups emphasize the necessity of responsible AI use and ethical integration into education. This collective perspective underscores the imperative for well-thought-out integration strategies to harness the benefits of AI tools, such as ChatGPT, while mitigating their potential drawbacks.

7. Conclusion

This study presents a nuanced perspective that elucidates the diverse opinions of stakeholders regarding the use of ChatGPT in education. While acknowledging its substantial benefits, concerns such as plagiarism, fostering academic complacency, and diminishing learning motivation have also been identified. A consensus among artificial intelligence experts, researchers, and educators indicates the necessity of regulatory measures to integrate ChatGPT into educational practices effectively. Students, corroborating this sentiment, advocate responsible adoption and appropriate utilization of ChatGPT rather than outright prohibition. These findings reinforce the need for the strategic integration of AI technologies, such as ChatGPT, in educational settings, a theme recurrent in the current literature [2, 11, 19, 37]. The integration of these perspectives highlights the multifaceted impact of ChatGPT on education, underscoring the shared concerns and distinct needs and viewpoints of each stakeholder group. However, this study was constrained by its reliance on qualitative data derived from 41 participants who responded to an open-ended question. Future studies should expand the investigation to include experimental designs exploring AI tools such as ChatGPT in diverse educational contexts. Involving additional stakeholders, such as parents, school administrators, and policymakers, could further enrich this research. Another limitation is the potential selection bias inherent in sourcing data solely from Twitter (X) and educational technology blogs, which potentially does not encompass the broader spectrum of opinions on ChatGPT's use in education.

The use of artificial intelligence in education has been the subject of various policy and strategy documents on a global scale. For example, the "Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators"

document created by the European Commission focuses on the ethical use of AI, data privacy, and student rights [10]. Similarly, in the "Transforming Education through Technology" Masterplan 2030 prepared by the Singapore Ministry of Education [32], it is stated that the use of AI should be integrated with teachers' pedagogical competencies and that this technology should be used to support educational processes [14]. In contrast, AI policies in the US provide pragmatic guidelines for integrating AI tools into teaching processes [3]. These different policies reveal that there is no common and consistent framework across countries and that there are still significant policy gaps in the responsible and ethical integration of AI into education. In this context, there is a clear need to develop common standards and guidelines for educational policies on a global scale.

7.1. Integration strategies

Based on the findings of this study, six key strategies were proposed for the integration of AI into education.

- *Organize AI competency training:* implement AI competency training for teachers and students to enhance their understanding of AI's limitations, vulnerabilities, and biases.
- *Start using AI in classes:* integrate AI tools into lesson plans, allowing students to engage with AI for problem-solving and creative tasks.
- *Establish ethical usage guidelines:* create clear policies for the ethical use of AI tools and foster responsible technology use.
- *Arranging critical thinking activities on AI:* classroom activities can be designed using AI tools such as ChatGPT to enhance critical thinking skills among students.
- *Enriching classes with AI:* assess AI's performance in various subjects to optimize its use in education.
- *Provide continuous feedback:* engage in ongoing feedback and evaluation to assess the effectiveness and impact of AI integration.

7.2. Recommendations

Future use of ChatGPT and similar AI tools in education should include the development of strategic and pedagogical approaches for AI integration and equipping students with critical thinking and fact-verification skills. Addressing issues such as the use of ChatGPT in exams could involve exploring new exam formats that accommodate AI integration into the examination process. A comprehensive strategy for managing ethical, private, and legal issues is also imperative. Ongoing research should continue to probe the multifaceted impact of AI technologies on education to foster a more robust understanding of their benefits, potential applications, and challenges. This approach will aid in devising responsible and ethical strategies for using AI tools such as ChatGPT in education.

This study lays a foundation for educators, researchers, and policymakers to integrate AI into educational environments. Collaboration to adopt well-conceived integration strategies enables stakeholders to harness AI's potential while addressing its challenges. In this context, reflecting on the broader societal and philosophical implications of AI technologies such as ChatGPT is crucial. Costello [4] critically examined AI in education, emphasizing the deeper implications of language proliferation and communication in the AI era. Similarly, Park [35] analyzed AI's intersection of AI and democracy using Adorno's philosophy to critique the narratives surrounding AI in the post-digital era. These perspectives highlight the importance of critically examining AI's influence on educational practices and democratic values. They invite a nuanced understanding of AI's role in education, emphasizing the need for educators and policymakers to critically assess the impact of AI on teaching, learning, and societal norms.

As we navigate the integration of tools such as ChatGPT, it is imperative to consider these dimensions, ensuring that our approach to AI in education is thoughtful, critical, and informed by a deep understanding of its potential implications.

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References

[1] Adeshola, I. and Adepoju, A.P., 2024. The opportunities and challenges of ChatGPT in education. *Interactive Learning Environments*, 32(10), pp.6159–6172. Available from: https://doi.org/10.1080/10494820.2023.2253858.

[2] Bitzenbauer, P., 2023. ChatGPT in physics education: A pilot study on easy-to-implement activities. *Contemporary Educational Technology*, 15(3), p.ep430. Available from: https://doi.org/10.30935/cedtech/13176.

[3] Cardona, M., Rodríguez, R. and Ishmael, K., 2023. *Artificial Intelligence and the Future of Teaching and Learning: Insights and Recommendations*. Office of Educational Technology. Available from: https://coilink.org/20.500.12592/rh21zz.

[4] Costello, E., 2024. ChatGPT and the Educational AI Chatter: Full of Bullshit or Trying to Tell Us Something? *Postdigital Science and Education*, 6(2), pp.425–430. Available from: https://doi.org/10.1007/s42438-023-00398-5.

[5] Creswell, J.W. and Miller, D.L., 2000. Determining Validity in Qualitative Inquiry. *Theory Into Practice*, 39(3), pp.124–130. Available from: https://doi.org/10.1207/s15430421tip3903_2.

[6] Creswell, J.W. and Poth, C.N., 2024. *Qualitative Inquiry and Research Design Choosing Among Five Approaches*. 5th ed. Sage Publications.

[7] Davis, F.D., 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), pp.319–340. Available from: https://doi.org/10.2307/249008.

[8] Duarte, F., 2025. *Number of ChatGPT Users (March 2025)*. Available from: https://explodingtopics.com/blog/chatgpt-users.

[9] Erfina, A. and Ramdani Alamsyah, M.R.N., 2023. Implementation of Naive Bayes classification algorithm for Twitter user sentiment analysis on ChatGPT using Python programming language. *Data and Metadata*, 2, p.45. Available from: https://doi.org/10.56294/dm202345.

[10] European Commission: Directorate-General for Education, Youth, Sport and Culture, 2022. *Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators*. Luxembourg: Publications Office of the European Union. Available from: https://doi.org/10.2766/153756.

[11] Firat, M., 2023. What ChatGPT means for universities: Perceptions of scholars and students. *Journal of Applied Learning & Teaching*, 6(1), pp.57–63. Available from: https://doi.org/10.37074/jalt.2023.6.1.22.

[12] Flick, U., 2018. Triangulation in Data Collection. In: U. Flick, ed. *The SAGE Handbook of Qualitative Data Collection*. SAGE Publications, chap. 34, pp.527–544. Available from: https://doi.org/10.4135/9781526416070.n34.

[13] Flores Limo, F.A., Hurtado Tiza, D.R., Mamani Roque, M., Espinoza Herrera, E., Muñoz Murillo, J.P., Jinchuña Huallpa, J., Ariza Flores, V.A., Rincón Castillo, A.G., Puga Peña, P.F., Martel Carranza, C.P. and Arias Gonzáles, J.L., 2023. Personalized tutoring: ChatGPT as a virtual tutor for personalized learning

experiences. *Przestrzeń Społeczna (Social Space)*, 23(1), pp.293–312. Available from: https://socialspacejournal.eu/menu-script/index.php/ssj/article/view/176.

[14] Foong, Y.P., Pidani, R., Sithira Vadivel, V. and Dongyue, Y., 2024. Singapore Smart Nation: Journey into a New Digital Landscape for Higher Education. In: A.O.J. Kwok and P.L. Teh, eds. *Emerging Technologies in Business: Innovation Strategies for Competitive Advantage*. Singapore: Springer Nature Singapore, pp.281–304. Available from: https://doi.org/10.1007/978-981-97-2211-2_13.

[15] Giorgi, A., 2009. *The Descriptive Phenomenological Method in Psychology: A Modified Husserlian Approach*. Pittsburgh, PA: Duquesne University Press.

[16] Heaven, W.D., 2023. ChatGPT is going to change education, not destroy it. *MIT Technology Review*, (May/June). Available from: https://www.technologyreview.com/2023/04/06/1071059/chatgpt-change-not-destroy-education-openai/.

[17] Holmes, W. and Miao, F., 2023. *Guidance for generative AI in education and research*. Paris: UNESCO Publishing. Available from: https://doi.org/10.54675/EWZM9535.

[18] Jones, J.E., Jones, L.L., Calvert, M.J., Damery, S.L. and Mathers, J.M., 2022. A Literature Review of Studies that Have Compared the Use of Face-To-Face and Online Focus Groups. *International Journal of Qualitative Methods*, 21, p.16094069221142406. Available from: https://doi.org/10.1177/16094069221142406.

[19] Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., Stadler, M., Weller, J., Kuhn, J. and Kasneci, G., 2023. ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, p.102274. Available from: https://doi.org/10.1016/j.lindif.2023.102274.

[20] Kılınç, H. and Fırat, M., 2017. Opinions of Expert Academicians on Online Data Collection and Voluntary Participation in Social Sciences Research. *Educational Sciences: Theory & Practice*, 17(5), pp.1461–1486. Available from: https://jestp.com/article-detail/?id=421.

[21] Kim, H.K., Roknaldin, A., Nayak, S.P., Zhang, X., Twyman, M., Hwang, A.H.C. and Lu, S., 2024. Empowering computer-supported collaborative learning with ChatGPT: investigating effects on student interactions. *2024 ASEE PSW Conference*. Las Vegas, Nevada: ASEE Conferences. Available from: https://doi.org/10.18260/1-2--46032.

[22] Kim, S., Shim, J. and Shim, J., 2023. A Study on the Utilization of OpenAI ChatGPT as a Second Language Learning Tool. *Journal of Multimedia Information System*, 10(1), pp.79–88. Available from: https://doi.org/10.33851/JMIS.2023.10.1.79.

[23] Kung, T.H., Cheatham, M., Medenilla, A., Sillos, C., De Leon, L., Elepaño, C., Madriaga, M., Aggabao, R., Diaz-Candido, G., Maningo, J. and Tseng, V., 2023. Performance of ChatGPT on USMLE: Potential for AI-assisted medical education using large language models. *PLOS Digital Health*, 2(2), pp.1–12. Available from: https://doi.org/10.1371/journal.pdig.0000198.

[24] Kutlucan, E. and Seferoğlu, S.S., 2024. Eğitimde Yapay Zekâ Kullanımı: ChatGPT'nin KEFE ve PEST Analizi [Use of Artificial Intelligence in Education: SWOT and PEST Analysis of ChatGPT]. *Türk Eğitim Bilimleri Dergisi*, 22(2), p.1059–1083. Available from: https://doi.org/10.37217/tebd.1368821.

[25] Lee, S.W. and Choi, W.J., 2023. Utilizing ChatGPT in clinical research related to anesthesiology: a comprehensive review of opportunities and limitations.

Anesthesia and Pain Medicine, 18(3), pp.244–251. Available from: https://doi.org/10.17085/apm.23056.

[26] Lincoln, Y.S. and Guba, E.G., 1985. *Naturalistic Inquiry*. SAGE Publications, Inc.

[27] Lindgren, B.M., Lundman, B. and Graneheim, U.H., 2020. Abstraction and interpretation during the qualitative content analysis process. *International Journal of Nursing Studies*, 108, p.103632. Available from: https://doi.org/10.1016/j.ijnurstu.2020.103632.

[28] Lo, C.K., 2023. What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature. *Education sciences*, 13(4), p.410. Available from: https://doi.org/10.3390/educsci13040410.

[29] Mao, J., Chen, B. and Liu, J.C., 2024. Generative Artificial Intelligence in Education and Its Implications for Assessment. *TechTrends*, 68(1), pp.58–66. Available from: https://doi.org/10.1007/s11528-023-00911-4.

[30] Mayring, P., 2022. *Qualitative Content Analysis: A Step-by-Step Guide*. SAGE Publications Ltd.

[31] Mhlanga, D., 2023. ChatGPT in Education: Exploring Opportunities for Emerging Economies to Improve Education with ChatGPT. Available from: https://doi.org/10.2139/ssrn.4355758.

[32] Ministry of Education, 2023. "Transforming Education through Technology" Masterplan 2030. Available from: https://www.moe.gov.sg/education-in-sg/educational-technology-journey/edtech-masterplan.

[33] Munawar, H.B. and Misirlis, N., 2024. ChatGPT in Classrooms: Transforming Challenges into Opportunities in Education. *The Future of Education - 14th Edition International Conference*. Available from: https://conference.pixel-online.net/files/foe/ed0014/FP/7813-ICT6299-FP-FOE14.pdf.

[34] Newton, D.P. and Newton, L.D., 2019. Humanoid Robots as Teachers and a Proposed Code of Practice. *Frontiers in Education*, 4. Available from: https://doi.org/10.3389/feduc.2019.00125.

[35] Park, S., 2024. Theodor W. Adorno, Artificial Intelligence, and Democracy in the Postdigital Era. *Postdigital Science and Education*, 6(4), pp.1287–1303. Available from: https://doi.org/10.1007/s42438-023-00424-6.

[36] Popovici, M.D., 2024. ChatGPT in the Classroom. Exploring Its Potential and Limitations in a Functional Programming Course. *International Journal of Human–Computer Interaction*, 40(22), pp.7743–7754. Available from: https://doi.org/10.1080/10447318.2023.2269006.

[37] Rahm, L. and Rahm-Skågeby, J., 2023. Imaginaries and problematisations: A heuristic lens in the age of artificial intelligence in education. *British Journal of Educational Technology*, 54(5), pp.1147–1159. Available from: https://doi.org/10.1111/bjet.13319.

[38] Snee, H., 2008. *Web 2.0 as a Social Science Research Tool*. (ESRC Government Placement Scheme). The British Library. Available from: https://www.restore.ac.uk/orm/futures/Web_2.0_final__v3.pdf.

[39] Su, J. and Yang, W., 2023. Unlocking the Power of ChatGPT: A Framework for Applying Generative AI in Education. *ECNU Review of Education*, 6(3), pp.355–366. Available from: https://doi.org/10.1177/20965311231168423.

[40] Williams, H., 2021. The Meaning of "Phenomenology": Qualitative and Philosophical Phenomenological Research Methods. *The Qualitative Report*, 26(2), pp.366–385. Available from: https://doi.org/10.46743/2160-3715/2021.4587.

[41] Wollowski, M., 2023. Using ChatGPT to produce code for a typical college-level assignment. *AI Magazine*, 44(1), pp.129–130. Available from: https://doi.org/10.1002/aaai.12086.