

TOWARDS FAIR AND RESPONSIBLE AI: A STUDY USING SWOT AND FOUR-COMPONENT MODEL TO ANALYSE ETHICAL AI IN EDUCATION

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Abstract

Some suggest that generative AI tools like ChatGPT can improve student learning, and therefore, educators should modify their teaching and assessment methods to accommodate the new reality of AI's widespread availability (Sullivan, Kelly, & McLaughlan, 2023), others suggest that certain universities have implemented bans on the usage of ChatGPT, leading some academics to view such tools as a "threat" and a "plague on education" (Sawahel, 2023). This study provides one of the first investigations using a SWOT analysis (Benzaghta, Elwalda, & Mousa, 2021) and the Four-Component model in decision-making (Rest, 1986) into how AI, or in this case, particularly ChatGPT or similar AI tools, are disrupting higher education. The focus areas guiding this analysis are to explore the perception of students and lecturers regarding the use of ChatGPT or similar tools as an AI assistant and ii) how students and lecturers perceive the ethical components when using these tools. The respondents were bachelor's and master's level students and lecturers from the Technical University Amberg-Weiden, Germany. The validity of the data was measured against standard quality criteria for quantitative data using SPSS. Depending on the two scenarios presented whether to "accept" AI with certain ethics and guidelines or to "ban" it, knowing that it is counted as cheating (Intelligent, 2023) or risk of increased plagiarism (Koutsoftas, 2023) this paper explores how to deal with the use of ChatGPT or similar AI tools in the future. Considering both points of view, guidelines should be introduced clarifying how AI tools can be integrated into education following certain ethics. Similarly, communicating the necessity for change to the university leadership is needed; also, lecturers should come up with methods of teaching not avoiding AI but using AI as an assistant to learning processes within ethical constraints.

Keywords: *Artificial Intelligence (AI), ChatGPT, higher education, ethics.*

1. Introduction

The integration of Artificial Intelligence (AI) has become increasingly prevalent in various fields, including education. The theory of using AI in higher education became a reality (Mollick & Mollick, 2022). This study delves into the exploration of ChatGPT, an AI language model, as a tool for teaching and learning. To gain a better understanding we aim to investigate the potential by conducting a SWOT analysis from both students' and lecturers' user perspectives to understand its capabilities. Through this approach, we identify the strengths, weaknesses, opportunities, and threats associated with the use of ChatGPT in educational experiences. Then, we analyzed how users perceive education while working with ChatGPT applying the Four-Component model. This approach allows us to map the ethical use of ChatGPT in teaching and learning environments and its role in shaping future education. Each of the models used in this analysis is described and evaluated below.

2. Theoretical background

AI was first introduced in 1955 by McCarthy, Minsky, Rochester, and Shannon (1955). "Artificial intelligence (AI) is defined as the branch of computer science that is concerned with the automation of intelligent behavior" (Lugar, 2005). AI technology is a broad term that encompasses various intelligent capabilities such as robotics, natural language processing, computer vision, machine learning, and more (Elbana, 2020). The use of AI applications is increasing rapidly (Gkinko & Elbana, 2023). Due to recent advancements in AI and natural language processing technologies, chatbots have become more accessible, versatile, and efficient in terms of implementation, adaptability, and the ability

to simulate human-like conversations (Caldarini, Jaf, & McGarry, 2022). A chatbot is a type of software that can generate responses based on the input it receives, making it capable of simulating human conversations through both text and voice modes of communication (Sojasingarayar, 2020). Nowadays, chatbots are being implemented in a wide range of fields and areas, such as education, e-commerce, healthcare, and entertainment (Caldarini, Jaf, & McGarry, 2022).

ChatGPT (Chat Generative Pre-Trained Transformer), one of the highly advanced chatbots that was launched on November 30th, 2022, has quickly become one of the most powerful and popular ones in the market (Farrokhnia, Banihashem, Noroozi, & Wals, 2023). The utilization of Natural Language Processing (NLP) and generative AI has allowed ChatGPT to create text that resembles human-like language and maintain a conversational tone, resulting in more realistic and natural dialogues (Tlili, et al., 2023). The communication format allows ChatGPT to address follow-up questions, acknowledge errors, challenge false premises, and reject unsuitable requests (OpenAI, 2022). Despite its widespread popularity, there is an ongoing discussion among scholars (Mhlanga, 2023) and several editorials (Rospigliosi, 2023) have written about its ethical usage and influence in education.

2.1. Strengths, weaknesses, opportunities, and threats

SWOT stands for Strengths, Weaknesses, Opportunities, and Threats often addressed as approach, framework, matrix, model, technique, or tool for analysis (Puyt, Lie, & Wilderom, 2023). SWOT was called SOFT approach in the beginning, which was designed as a tool in one of the earliest strategic planning frameworks. This approach has found extensive application in the field of business and education to guide effective strategic planning and decision making, particularly when it is necessary to consider the views and abilities of different stakeholders (Zhu & Mugenyi, 2015). This analysis provides information from different sources and provides a comprehensive assessment of the strengths and weaknesses internally and opportunities and threats that exist externally. This analytical framework can be particularly helpful in identifying and addressing benefits and challenges related to the integration of new technologies in education (Farrokhnia, Banihashem, Noroozi, & Wals, 2023).

2.2. Ethical decision-making

Ethical decision-making (EDM) is well accepted now; therefore, it is crucial to understand the importance of EDM not only in the corporate community but also in academic management and society as a whole (Schwartz, 2016). Several theoretical models have been proposed to explain why people sometimes behave ethically or unethically in various situations and these models draw on different academic fields like philosophy, psychology, economics, and so on. To better understand EDM, it is important to understand the stages which generally start with the initial awareness, leading to moral judgment, forming an intention to act, and finally engaging in a behavior (Rest & Narvaez, 1994). Individuals, when faced with ethical dilemmas, undergo a decision-making process that consists of four components; moral awareness, which is the realization of a scenario, to moral judgment, which is the assessment, and then they move to moral intention, which involves how to act, and finally, moral action, which is the actual behavior (Lincoln & Holmes, 2007).

2.3. Conceptual framework

Research in Generative AI (GenAI) applications (Peres, Schreier, Schweidel, & Sorescu, 2023), which is a type of AI technology that creates new and unique outputs, is ongoing in business and higher education (Chiu, 2023). There have been various reports, journals, and posts published regarding the benefits of using ChatGPT. We conducted a semantic search using various keywords such as “AI in education”, “ChatGPT in education”, and “ethical use of ChatGPT”. Our focus was on articles published in the year 2023, and we found multiple articles (see Figure 1).

After studying relevant theories, we formulated research questions and hypotheses (see Table 1) that we will analyze in this paper.

Figure 1. Semantic search on most recent research (Litmaps, 2024).

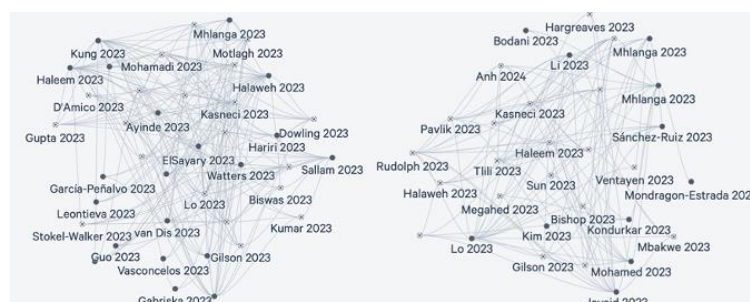


Table 1. List of research questions and respective hypotheses.

<i>RQ₁</i>	<i>H₁</i>	<i>H₂</i>
What is the perception of students and lecturers regarding the use of ChatGPT or similar tools in an educational setting?	Students will generally view the use of ChatGPT in an education setting as a valuable tool for learning	Lecturers will perceive ChatGPT as a useful aid in teaching and are anticipating educational settings will benefit positively
<i>RQ₂</i>	<i>H₃</i>	<i>H₄</i>
How do students and lecturers prioritize the four ethical decision-making components when incorporating ChatGPT into their learning and teaching methodologies?	There are significant differences in the ethical decision-making patterns between students and lecturers in their use	Students believe that lecturers should be more transparent in guiding them on the incorporation of ChatGPT into learning

3. Methodology

To answer the aforementioned research questions and hypotheses, we began by gathering data from students and lecturers. We used a paper-pencil method to obtain accurate responses (Bates & Cox, 2007) and have included demographic details in Table 2. A total number of diverse students ($n=77$) and lecturers ($n=16$) participated in this study. Students were asked questions regarding their usage of ChatGPT as a learning tool and lecturers were asked about their use of ChatGPT for research and content creation for teaching. Subsequently, we measured the validity of our data against standard quality criteria for the quantitative data using SPSS.

Table 2. Demographic details of participants.

Demographics- Students	n	%	Demographics- Lecturers	n	%
Total	77	100	Total	16	100
Male	47	61	Male	6	40
Female	30	39	Female	10	60
Nation					
Bangladesh	12	15	Bangladesh	03	18.75
Germany	10	13	Germany	13	81.25
India	09	12			
Nigeria	08	10			
Pakistan	13	17			
Sri Lanka	02	03			
Others*	23	30			

*Algeria, Burma, China, Egypt, Kenya, Laos, Morocco, Myanmar, Romania, Russia, Syria, Taiwan, Tunisia, Vietnam

4. Data analysis

To answer the aforementioned research questions and hypotheses, we began to evaluate the collected data sets and ran several analyses on SPSS. To evaluate RQ_1 regarding the use of ChatGPT and similar tools in educational settings as perceived by students and lecturers, we considered the means for H_1 . The cluster of items dealing with the strengths and opportunities of ChatGPT as a research and inspirational tool all provided mean values between $\bar{x} = 2,68$ and $\bar{x} = 3,19$ on a 4-point-Likert scale with 1=strongly disagree and 4=strongly agree. Therefore, H_1 can be accepted.

H_2 also serves to answer RQ_1 , since it dealt with lecturers' perception of the use of ChatGPT or similar AI tools as a useful aid in teaching. Based on the means of the frequency distribution ranging from $\bar{x}=2,63$ to $\bar{x}=3,44$, it becomes apparent, that the lecturers also anticipate AI to be an advantageous assistance in their educational settings. Therefore, H_2 can also be accepted.

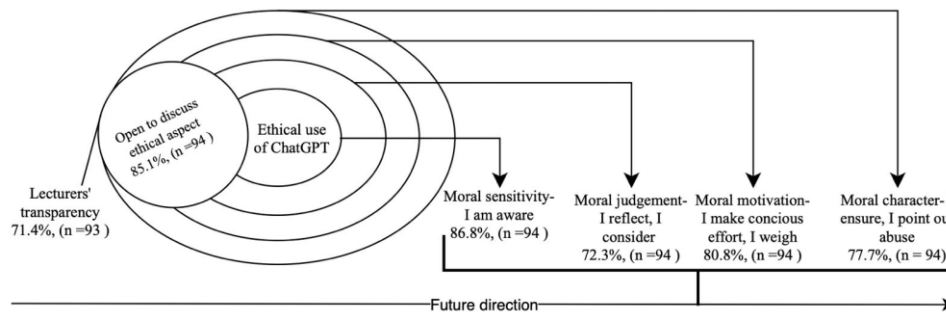
For RQ_2 , we wanted to find out about ethical concerns in students' and lecturers' usage of AI. To assess this, we conducted a two-sided independent sample t-test between the data sets of the two groups. None of the items evaluated concerning ethical decision-making patterns provided significant differences ($\alpha=0.05$) between students and lecturers. Therefore, H_3 needs to be rejected.

Furthermore, H_4 dealt with the belief of students' perception that more guidance by lecturers is needed concerning the use of AI. Here, the data revealed that a $\bar{x}=3,52$ indicates a very strong need of the students requiring guidance and information about the proper and ethical use of AI in their educational journey. Therefore, H_4 can be accepted.

5. Discussion, limitations, and future research

Students and lecturers expressed a notable interest in incorporating ChatGPT into academic settings. However, ethical considerations played a significant role in their decision-making (Figure 2). Results also indicated a high level of moral sensitivity, judgement, motivation, and desire to take action regarding using the AI tools in academic settings. Furthermore, students exhibit a willingness to engage in open discussions surrounding the ethical aspects of using ChatGPT. Additionally, there is an expectation among students that lecturers should provide transparency regarding how ChatGPT can be appropriately utilized within the educational context.

Figure 2. Model: Integrated ethical usage of ChatGPT (own illustration).



Therefore, we highly recommend educational institutions act accordingly and provide role modeling in the use of AI. This can take the form of ethics commissions or statutes provided to the students. The first important overarching step in this direction was made by the European Union in December 2023, when the EU AI Act was passed in the European Parliament (News European Parliament, 2023).

5.1. Limitations

The small sample size from only one university in Bavaria as well as a limited number of lecturers participating pose limitations on the research. It would be imperative to connect between universities and develop a (joint) policy or to compare with other universities and also other continents and see if there is already a policy in place.

5.2. Future research

While this topic is very new, it is nonetheless apparent that a great need exists to explore AI's ethical use further. Whether it is in the domain of text production or in the area of graphic developments, AI will disrupt creative use and academia further. Integrated ethical decision-making using ChatGPT and continuous feedback from users to improve may result in more responsible and ethical integration of this valued tool in the educational environment.

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