مجلــة العلــوم
الهندسية والتقنية
مجلة علمية محكمة - تصدر عن كلية الهندسة وكلية الحاسبات والمعلوماتية – جامعة ذمار

Improving Learning and Teaching Methods Using Chatgpt in Higher Education: A Case Study of IBB University

Muneer Alsurori[1], Ayedh Abdulaziz Mohsen[1,2], Hezam Gawbah[1], Soliman Albaraky[1], Shaima Abdulkreem[1]

[1]Department of Computer Sciences & Information Technology IBB University, Yemen.

[2]Department of IT, Alqalam University, Yemen.

msurory@yahoo.com, ayedh992001@hotmail.com, hezammaster2022@gmail.com, Solimanalbarmaky2018@gmail.com, Shaimaalabasi@gmail.com

Abstract:

ChatGPT's impressive natural language generation capabilities represent a major advance in practical applications of AI-generated information. The potential use cases for ChatGPT are wide-ranging, including assessment setup, translation tasks, and custom source code creation. It can also handle more complex aspects of scientific writing, such as summarizing the literature and paraphrasing text. The difficulties and challenges of using ChatGPT in learning and teaching methods vary from one society to another and from one country to another, and there are many factors. Therefore, this paper aims to investigate the possibility of improving learning and teaching methods using ChatGPT in higher education. It presents the main challenges and notable opportunities that arise from the introduction of ChatGPT in the context of higher education. In line with the aim, the question guiding the study is: "How can learning and teaching methods be improved using ChatGPT in higher education?" To answer this question, a qualitative exploratory case study was conducted at the Department of Information Technology, Faculty of Science, IBB University. An electronic questionnaire containing closed questions was sent to all students. 93 responses were obtained via email, which constituted the sample of participants in this study. The primary contribution of this study is to provide a proposal on how to effectively integrate ChatGPT into higher education and improve learning and teaching methods in key areas.

Keywords: ChatGPT, Higher Education, Learning Methods, Teaching Methods, Artificial Intelligence, Natural Language Generation.

1. Introduction

Since the release of ChatGPT in November 2022, the field of higher education has quickly recognized the potential of generative AI in enhancing various traditional tasks (Omer, 2024, & Al-Ghobesi, 2025, Ahmed, 2025) [2]. The remarkable natural language capabilities of ChatGPT have revolutionized the practical applications of AI-generated information. Its use in the realm of higher education are extensive, ranging from assessment preparation and translation tasks to the generation of customized source code [3]. Furthermore, it can address more complex aspects of scientific writing, such as literature summarization and text paraphrasing [4]. Given the impressive natural language generation capabilities of ChatGPT, it represents a significant advancement in the practical applications of AI-generated information [6]. However, the problem with learning and teaching methods is the challenges and difficulties associated with using ChatGPT which may vary across societies and countries, and are affected by different factors.

This paper aims to foster a discussion on the possibility of improving learning and teaching methods in higher education through the integration of ChatGPT. To address this objective, a qualitative exploratory case study was conducted in the Department of Information Technology at IBB University. A questionnaire containing closed questions was distributed to all students, and a total of 94 responses were collected via email, forming the sample for this study. By identifying the main challenges and notable opportunities arising from the introduction of ChatGPT in the higher education context, this study seeks to provide valuable insights for effectively integrating ChatGPT into higher education and enhancing learning and teaching methods in key areas.

The primary contribution of this research is to provide suggestions on the effective incorporation of ChatGPT into higher education to enhance learning and teaching methods in key areas.

2. Review of the Related Literature

In [1], the much-touted artificial intelligence (AI) is yet to attain a level of intelligence commensurate with these claims. GPT-4 and its predecessor demonstrate superior performance, while Bing Chat and Bard resemble underperforming students with consistently failing grades. This article presents four distinct categories of recommendations tailored to key stakeholders in higher education. In [2], the aim was to

determine how the use of ChatGPT on the digitalized teaching system among university students in Peru. Descriptive statistics and linear regression analysis were utilized to analyze the data collected randomly from 216 students' responses on the Twitter website regarding their experiences with ChatGPT. The findings demonstrate that ChatGPT has a significant influence on the digitalized learning process, as a substantial number of students express a preference for utilizing ChatGPT to fulfill various academic tasks. In [3], drawing upon the theoretical framework of creative writing, this scholarly article endeavors to examine the ChatGPT system and its influence on the dearth of creativity observed in students' writing abilities. Employing qualitative methodologies, the study employs library research as the primary data collection approach, analyzing scientific journals and other pertinent articles to facilitate an in-depth discussion on the topic at hand. In [4], examined ChatGPT's potential to take the position of instructors in the classroom teaching process in great detail. The nature of research is qualitative. Careful documentation of pertinent information and attentive listening were key components of the data collection process. The material was then submitted to analytical processes such data reduction, data presentation, and conclusion drafting. The study came to the conclusion that technology can only be used as a tool when it comes to employing ChatGPT in teaching. In [5], the central questions and problem statements pertaining to the utilization of ChatGPT for self-determined learning within higher education were examined. The paper intended to synthesize and critically evaluate the existing literature on the potential of ChatGPT to support self-directed and self-determined learning and highlight the main challenges and concerns associated with its use. The findings suggest that the progression of ChatGPT-based interventions for self-determined learning in higher education necessitates an intricate and interdisciplinary approach that takes into account the perspectives of educators, researchers, learners, and other relevant stakeholders. In [6], content analysis was used to examine 100 news articles about how ChatGPT is disrupting higher education, concentrating specifically on Australia, New Zealand, the United States, and the United Kingdom. The analysis aimed to explore various key themes including university responses, academic integrity concerns, the limitations and weaknesses of AI tool outputs, and opportunities for student learning. The data reveals mixed public discussion and university responses, mostly centered on issues related to academic integrity and creative possibilities for assessment design.

Table. (1) Review of the Related Literature.

Re.	Year	Method	Objectives	Data	Results
[1]	2023	Descriptive comparative	describe the comparative method and present a method of comparison of a few chosen chatbots on a multidisciplinary test that is pertinent to higher education.	Some of the most promising chatbots in the English and Chinese-language spaces	There are currently no A-students and no B-students in this bot cohort, despite all publicized and sensationalist claims to the contrary. GPT-4 and its predecessor did best, whilst Bing Chat and Bard were akin to at-risk students with F-grade averages.
[2]	2023	Descriptive statistics and linear regression analysis	To determine the influence of ChatGPT on the digitalized teaching system among Peruvian University students.	216 students' responses on the Twitter website on the various experiences they have of ChatGPT	The study concludes that ChatGPT significantly affects the digitalized learning process, as many students prefer to use ChatGPT to handle tasks.
[3]	2023	Qualitative	To discuss the ChatGPT system and its influence on pupils' lack of writing inventiveness.	Scientific journals and other articles relevant	ChatGPT, with its ability to provide answers according to the keywords entered by the user, can positively influence the world of teaching and learning.
[4]	2023	Qualitative	To explore the role of technology in the classroom learning process, particularly in terms of altering the teacher's position as the primary instructor.	Literature review	In the context of utilizing ChatGPT for teaching all purposes, it should be noted that technology can only be a tool and cannot replace the role of the teacher entirely. Therefore, it is necessary to integrate technology in learning in an appropriate and effective way and develop the competence of teachers in managing learning with technology.
[5]	2023	Analysis	To e examine the major research questions and problem statements concerning the usage of Chat GPT for self-determined learning in higher education.	Literature review	Advancement of ChatGPT-based interventions for self-determined learning in higher education necessitates a nuanced and multidisciplinary approach that considers the viewpoints of educators, researchers, learners, and other interested stakeholders.
[6]	2023	Analysis	To conduct a sentiment analysis about how ChatGPT is disrupting higher education.	News articles (N=100) about how ChatGPT	Relatively balanced in the number of times positive (n=912) and negative (n=1034) language was coded.
[7]	2023	Exploration	To explore the perspectives of students and educators on the implications of ChatGPT and AI integration in the	Responses of seven scholars and 14 PhD students from four countries – Turkey, Sweden, Canada and	Based on these findings, suggestions for future research include further exploration of the ethical implications of AI for teaching, the development of strategies to manage privacy concerns, and the investigation of how

Re.	Year	Method	Objectives	Data	Results
			context of universities	Australia	teaching al institutions can best prepare for the integration of AI technologies
[8]	2023	Qualitative	To explore the perceptions of educators and students on the use of ChatGPT in teaching during the digital era	Ten educators and 15 students from different academic institutions in Krabi, Thailand	The findings showed some concerns regarding the use of ChatGPT in teaching. Participants were worried about the accuracy of information provided by the chatbot and the potential loss of personal interaction with teachers. The need for privacy and data security was also raised as a significant concern
[9]	2023	-	To address the need for discussion of potential approaches for integrating ChatGPT into higher education	five out of 55 preprints and discussions and talks with other lecturers and researchers and took into account the authors' test results from using ChatGPT	A proposal for how to integrate ChatGPT into higher education in four main areas
[10]	2023	-	To examine the potential benefits and challenges of using the generative AI model, ChatGPT, in higher education, in the backdrop of the constructivist theory of learning	-	Integrating ChatGPT within higher education necessitates the establishment of a delicate equilibrium that addresses both the prevention of academic misconduct and the promotion of academic freedom and innovation, all while prioritizing the cultivation of essential graduate skills. By striking this balance, ChatGPT can emerge as a valuable instrument that enriches, rather than impedes, students' teaching al journeys

3. Method

This section provides a concise overview of the research methodology used in the study. A qualitative and descriptive statistics methodology was employed to identify the opportunities and challenges of implementing ChatGPT in higher education in Yemen. A qualitative exploratory case study was conducted in the Information Technology Department at IBB University. An electronic questionnaire with closed questions was distributed to all students, resulting in 94 responses as the participant sample. Data were analyzed using qualitative and descriptive statistical techniques. Measures were taken to ensure the study credibility included careful questionnaire design, participant confidentiality, and validation through multiple perspectives.

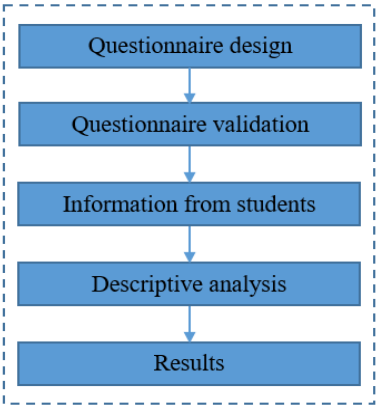

FIGURE 1: Method.

3.1. Questionnaire design

the questionnaire was designed and then divided into two axes: opportunities and threats, as in Figure 1.

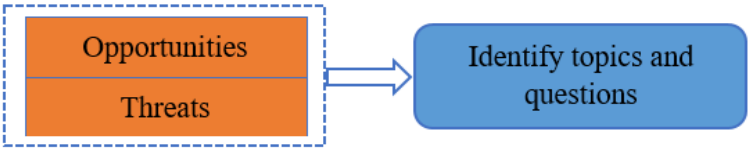

FIGURE 2: The stage of questionnaire design.

3.2. Questionnaire validation

The purpose of this verification is that the opportunities and challenges in the questionnaire can be used to reach a general conclusion regarding the variables that improve learning and teaching methods using ChatGPT in higher education, as in Figure 2.

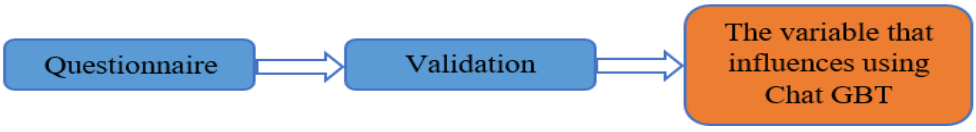

FIGURE 3: The stage of questionnaire validation.

3.3. Information from students

One of the crucial steps in exploring opportunities and threats in learning and teaching methods using ChatGPT in higher education is to collect information directly from academics. One way to collect data

is to use a questionnaire, as shown in Figure 3. The questionnaire focuses on two main axes: opportunities and threats. 94 students participated in the survey, providing valuable insights into improving learning and teaching methods using ChatGPT in higher education.

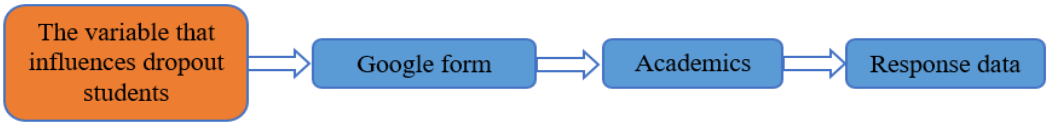

FIGURE 4: The stage of seeking information from students.

3.4. Descriptive analysis

Descriptive analysis is shown in Figure 4. In this step, we apply descriptive analysis after preparing the data collected from the students using SPSS to obtain the results.

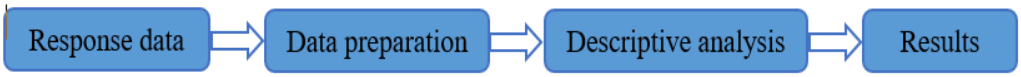

FIGURE 5: The stage of descriptive analysis.

4. Result

The research question guiding this study was "How can learning and teaching methods be improved using ChatGPT in higher education?" A study design was used to explore the opportunities offered by ChatGPT and the challenges that arise from its use with the aim of improving learning and teaching methods in higher education. Data were collected from 93 participants from the Department of Information Technology, University IBB using a questionnaire that included closed questions. After collecting the questionnaires, they were reviewed to ensure their validity and suitability for statistical analysis. They were computer tabulated and formatted using the Statistical Package for the Social Sciences (SPSS) program.

In the analysis, the researcher relied on a set of statistical methods for the aforementioned questionnaire topics, including:

- Descriptive analysis methods represented by frequencies and percentages of the main variables and factors for identifying the general demographic characteristics of the research sample. Arithmetic averages (Means) and standard deviations (Std. Deviation) were also used in order to answer questions related to graduated scales (Scales) to know the students' answers to the questionnaire statements to determine the main reasons for dropout.

After tabulating the data, copying it to the computer, and processing it statistically, the results of the statistical analysis showed the reliability of the questionnaire questions (honesty). A three-point Likert scale was used in its design. It has also been proven that this measure is stable and does not contradict itself, meaning that the measure gives the same results with a probability equal to the value of the coefficient if it is re-applied to the same sample. The total Cronbach's alpha value for the first axis (opportunities) is equal to 75%, while for the second axis (challenges), the Cronbach's alpha value is equal to 64%.

4.1. Opportunities

Table. (2) the statistical analysis of the first axis, "Opportunities".

No.	Opportunities	Agree	Disagree	Neutral	Mean	Std. De	Ranking
1	A free resource available to everyone around the clock	75.3%	16.1%	8%	1.3333	.63131	7
2	Easy to use and handle	92.5%	2.2%	5.4%	1.1290	.47149	1
3	It contributes to overcoming the disparity in capabilities and resources between teaching al institutions	55.9%	11.8%	32.3%	1.7634	.91364	13
4	It has an extensive database of learning and teaching resources	89.2%	3.2%	7.5%	1.1828	.55062	2
5	It is used to determine your level for the course or scientific field	33.3%	38.7	28.0	1.9462	.78527	16
6	It provides the learner with clear information and increases his motivation to learn	74.2%	10.8%	15.1%	1.4086	.74069	8
7	It facilitates and understands the application of theories, rules and laws	75.3%	7.5%	17.2%	1.4194	.77069	6
8	It helps teachers prepare for scientific content to save time and effort	79.6%	7.5%	12.9%	1.3333	.69678	4
9	It trains the learner to employ information and practice skills, making learning lasting	62.4%	18.3%	19.4%	1.5699	.79943	12
10	It has an important and effective role in solving the problems of guidance and counseling for learners	68.8%	8.6%	22.6%	1.5376	.84131	9
11	It helps in correcting grammatical and spelling errors and finding linguistic synonyms	67.7%	10.8%	21.5%	1.5376	.82829	10
12	Helps manage classroom logistics and announcements including scheduling, alerts, wording announcements, and even setting appointments	36.6%	30.1%	33.3%	1.9677	.83992	15

No.	Opportunities	Agree	Disagree	Neutral	Mean	Std. De	Ranking
13	It is used to suggest effective strategies to improve communication between the teacher and the student	55.9%	22.6%	21.5%	1.6559	.81420	14
14	Used to help you organize information	77.4%	11.8%	10.8%	1.3333	.66485	5
15	Used to search and collect relevant content and links for your lessons	83.9%	7.5%	8.6%	1.2473	.60174	3
16	It helps in developing teaching al courses in line with modern knowledge and advanced technological mechanisms	64.5%	12.9%	22.6%	1.5806	.83825	11

From Table (2), the results of the statistical analysis of the opportunities indicate that the opportunity ranked 1 improving learning and teaching methods using ChatGPT in higher education by 92.5%, with an arithmetic mean (1.1290) and a standard deviation (.47149). The opportunity ranked 2 improving learning and teaching methods using ChatGPT in higher education by 89.2%, with a mean (1.1828) and standard deviation (.55062). The opportunity ranked 3 improving learning and teaching methods using ChatGPT in higher education by 83.9%, with a mean (1.2473) and standard deviation (.60174). The rest of the opportunities are as shown in the table according to the ranking column.

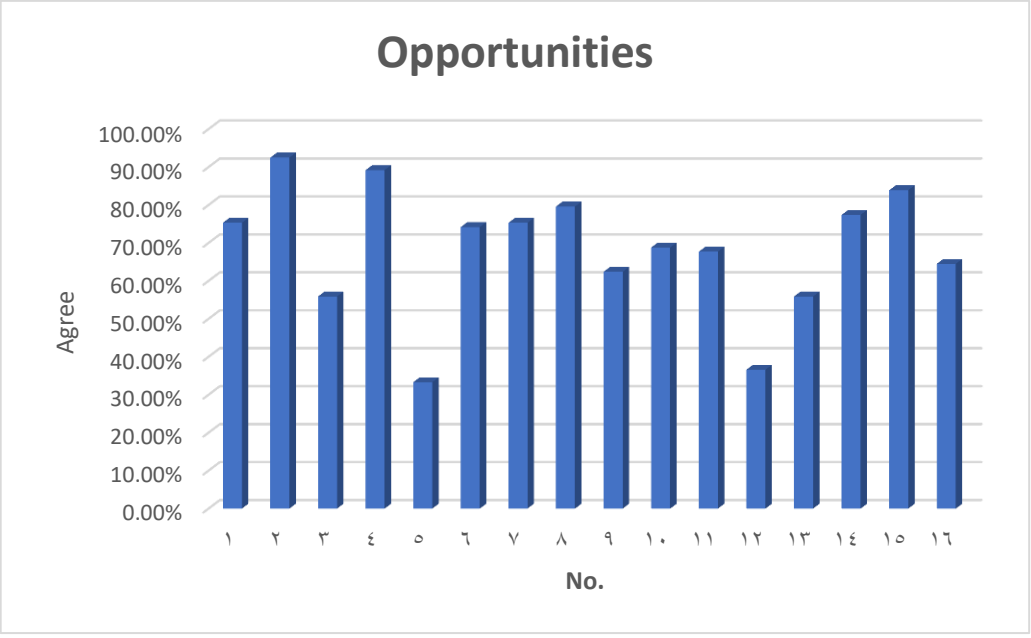

FIGURE 6: the agree rate of the first axis, "Opportunities".

4.2. Threats

Table. (3) the statistical analysis of the second axis, "Threats".

No.	Threats	Agree	Disagree	Neutral	Mean	Std. De	Ranking
1	It threatens the originality of ideas and scientific rights and increases the possibility of plagiarism	65.6%	20.4%	14.0%	1.4839	.73148	4
2	Concerns about breaching user privacy	58.1%	14.0%	28.0%	1.6989	.88201	5
3	Difficulty in assessing students' knowledge using the human mind if students submit assignments created by using ChatGPT	73.1%	11.8%	15.1%	1.4194	.74195	1
4	There is data misuse when used to generate a large amount of data from unknown sources	65.6%	17.2%	17.2%	1.5161	.77478	3
5	Often he did not succeed in providing an accurate answer, but rather provided false and illogical information	65.6%	15.1%	19.4%	1.5376	.80162	2
6	Answering religious questions and fatwas	25.8%	44.1%	30.1%	2.0430	.75056	6

As shown in Table (3), the results of the statistical analysis of the threats indicate that the threat ranked 1 improving learning and teaching methods using ChatGPT in higher education by 73.1%, with an arithmetic mean (1.4194) and a standard deviation (.74195). The threat ranked 2 improving learning and teaching methods using ChatGPT in higher education by 65.6%, with a mean (1.5376) and standard deviation (.80162). The threat ranked 3 improving learning and teaching methods using ChatGPT in higher education by 65.6%, with a mean (1.5376) and standard deviation (.80162). The rest of the threats are as shown in the table according to the ranking column.

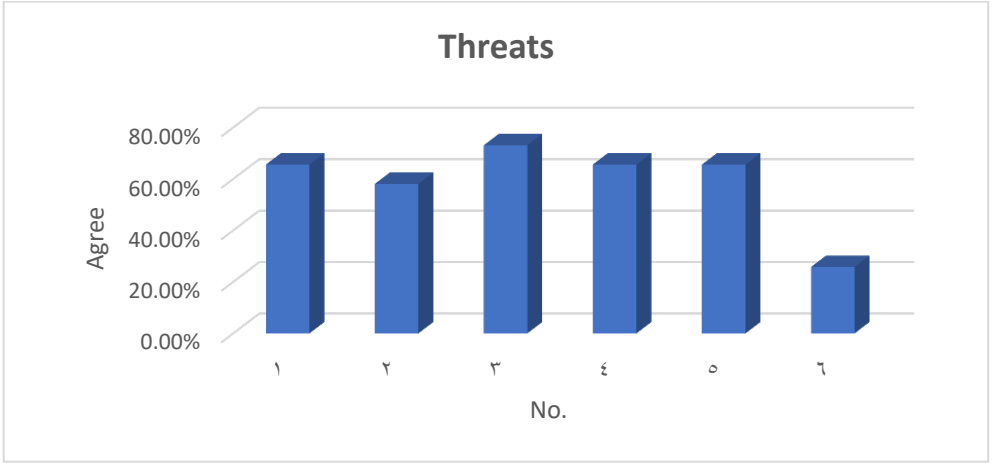

FIGURE 7: the agree rate of the second axis, "Threats".

5. Recommendations

In accordance with the findings of this study, and in the context using of ChatGPT, the study offers some significant recommendations for improving learning and teaching methods using ChatGPT in higher education as follows:

- Banning or prohibiting

Banning or prohibiting ChatGPT will not help. Such action may frustrate instructors, learners, and regulators. It is better to embrace it and set clear ground rules for its use in higher education teaching.

- Educators

For educators, it is going to be as transformational as Google was in 1998, and requires a serious conversation about the benefits, challenges and implications for schools and learners. The future will be changed by it indelibly. Educators have to start engaging with it in a meaningful way through peer support and mentoring for faculty members to increase skill level and share good practices for teaching and ways of using ChatGPT in research

- Oversight, transparency, and assessment

ChatGPT still constitutes a real threat to conventional assessment models. We need more oversight and transparency to discern human-created content from AI-created content. It is clear that future models of assessment will need to prioritize independent and critical thinking, deductive reasoning, creative thinking, and questioning and validating data inputs.

- Academic integrity

Examine and revise academic integrity/honesty rules in connection to ChatGPT and other AI tools.

- Teaching in higher education

Universities should integrate artificial intelligence into their curricula to enhance learning quality and prepare students for the ever-changing technological world. This includes incorporating AI into existing curricula and developing new courses focusing on technology, enabling students to acquire transferable skills to effectively utilize and manage AI tools.

- Self-learning

Universities must teach students the skills needed to tackle the challenges posed by ChatGPT/AI, sometimes the information he had learned could be wrong, or it may not be accurate or complete.

- Prompts (How to question AI?)

To produce a more relevant result, provide ChatGPT with prompts about how you want it to respond. You also need to keep in mind that the answers provided by generative AI need to be reviewed and checked, as many tools are still being trialed or have fewer features than the paid versions. teachers, researchers, and students should be trained to improve the queries they pose to ChatGPT.

- Build capacity to understand and manage ChatGPT

For increasing ability to comprehend and handle ChatGPT, adapting to higher education in the ChatGPT era necessitates that HEIs consider their role in developing ability to comprehend and manage ChatGPT and AI through new programmes, workshops, seminars and courses that focus on ChatGPT.

1. Conclusion

While incorporating ChatGPT technology into learning and teaching can have immense benefits, it is crucial to remember that technology should only serve as a tool and not to take the place of a teacher's role entirely. As such, it is essential for both tertiary educators and students to handle this technology with caution and use it ethically, reliably, and effectively for academic purposes. Higher education institutions bear the responsibility of teaching students about the responsible and ethical use of ChatGPT and other generative AI tools to ensure its accurate implementation. In addition, educators can come up with innovative assessment methods that ChatGPT cannot easily replicate, such as evaluating the learning process rather than just the end result.

On a more positive note, we are optimistic about incorporating ChatGPT or similar AI tools in the future to automate certain tasks and processes such as study guides, summaries, concept maps, and practice tests. This will allow for a shift in focus towards the human aspect of teaching, moving away from reliance on memorization and instead emphasizing the acquisition of enduring skills necessary for the future workforce. As we have already witnessed, by utilizing ChatGPT in the right way, we can unlock its full potential and enhance the educational process.

References

[1] Rudolph, J., Tan, S., & Tan, S. (2023). War of the chatbots: Bard, Bing Chat, ChatGPT, Ernie and beyond. The new AI gold rush and its impact on higher education. *Journal of Applied Learning and Teaching*, *6*(1).

[2] Castillo, A. G. R., Silva, G. J. S., Arocutipa, J. P. F., Berrios, H. Q., Rodriguez, M. A. M., Reyes, G. Y., ... & Arias-Gonzáles, J. L. (2023). Effect of Chat GPT on the digitized learning process of university students. *Journal of Namibian Studies: History Politics Culture*, *33*, 1-15.

[3] Shidiq, M. (2023, May). The use of artificial intelligence-based chat-gpt and its challenges for the world of teaching; from the viewpoint of the development of creative writing skills. In *Proceeding of International Conference on Teaching, Society and Humanity* (Vol. 1, No. 1, pp. 353-357).

[4] Ausat, A. M. A., Massang, B., Efendi, M., Nofirman, N., & Riady, Y. (2023). Can ChatGPT replace the role of the teacher in the classroom: A fundamental analysis. *Journal on Teaching*, *5*(4), 16100-16106.

[5] Baskara, F. R. (2023, May). The Promises and Pitfalls of Using Chat GPT for Self-Determined Learning in Higher education: An Argumentative Review. In *Prosiding Seminar Nasional Fakultas Tarbiyah dan Ilmu Keguruan IAIM Sinjai* (Vol. 2, pp. 95-101).

[6] Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning.

[7] Firat, M. (2023). What ChatGPT means for universities: Perceptions of scholars and students. *Journal of Applied Learning and Teaching*, *6*(1).

[8] Limna, P., Kraiwanit, T., Jangjarat, K., Klayklung, P., & Chocksathaporn, P. (2023). The use of ChatGPT in the digital era: Perspectives on chatbot implementation. *Journal of Applied Learning and teaching*, *6*(1).

[9] Neumann, M., Rauschenberger, M., & Schön, E. M. (2023). "We Need to Talk about ChatGPT": The Future of AI and Higher education.

[10] Rasul, T., Nair, S., Kalendra, D., Robin, M., de Oliveira Santini, F., Ladeira, W. J., ... & Heathcote, L. (2023). The role of ChatGPT in higher education: Benefits, challenges, and future research directions. *Journal of Applied Learning and Teaching*, *6*(1).

[11] Ahmed, M. R. A. (2025). Accreditation and Quality Assurance: Exploring Impact and Assessing Institutional Change in the US and Saudi Arabian Higher Education Institutions. *Arts for Linguistic & Literary Studies*, *7*(1), 626–639. https://doi.org/10.53286/arts.v7i1.2419

[12] Al-Ghobesi, A. A. H. (2025). Risks of Relying on Artificial Intelligence in Learning Arabic Language Sciences Through the Meta Application. *Arts for Linguistic & Literary Studies*, *7*(1), 396–419. https://doi.org/10.53286/arts.v7i1.2420

[13] Omer, N. I. M. (2024). Maintaining Meaningful Human Interaction in AI-Enhanced Language Learning Environments: A Systematic Review . *Arts for Linguistic & Literary Studies*, *6*(3), 533–552. https://doi.org/10.53286/arts.v6i3.2083