

## Enhancing Academic Learning Through Artificial Intelligence in Higher Education

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### Abstract

Through collection of data, this study analyses how functional artificial intelligence tools like Chat GPT and Chat bots helps students learn at the higher education level. While AI is making ways into academic domains and is finding a place in the learning-teaching setting. It is vital to gain a realization of AI benefits and effects on the learners learning activities and achievements. This research therefore seeks to determine how various AI tools enhancing learning in higher education level. The study has three primary objectives: The first objective was to determine the effectiveness of AI tools in improving students learning at higher education level; the second objective was to explore the benefits that students reap from AI tools in their academic learning; and the last objective was to establish challenges faced by students when using AI tool in learning at the higher education level. In this current research, Undergraduate and Postgraduate students in Islamabad were targeted. By employing a qualitative research design, data was collected via semi structured interviews with sampled higher education students who often interact with artificial intelligence tools for academic purpose. Purposive sampling was used in this current research study. By using electronic method data was gathered. The collected data was analyzed manually using Braun and Clarke's (2006) thematic analysis framework make codes and themes, and then compiling a report. The analysis was made based on participant's experiences and perceptions. The study reveals that AI tools have many advantages; more information sources, individual learning process, as well as an improved support for research. Moreover, with the help of AI learning tools, which are also known as Intelligent systems, the students receive immediate feedback and which enable them to interact, in a way that refines their problem-solving abilities. However, the study also points out the issues like the overreliance of the systems in the tools powered by Artificial Intelligence (AI) plus the challenge associated with the issues of data privacy. These findings stress the requirement for moderation and ethically driven Artificial Intelligence (AI) appropriation in higher education with AI instruments suggested to act as an assistant in education processes rather than as a definitive solution Educators should aim to develop tests that limit students 'dependency on Artificial Intelligence (AI) tools and also, it would be important that clear rules regarding the use of AI in learning environments must be formulated to counter the inadequacies of privacy and ethical concerns.

**Keywords:** AI, Chat GPT and Chat bots, Students' learning, Higher education

### Introduction

AI is gradually finding its way in the society and in different facets of the modern society. It is employed in several disciplines or settings, changing how work is being performed. It assists in resolving and making easier to solve complex issues, which exist in medical care and financial,

sales, transport, production, support service, trading, protection against cyber threats, staff, legal, etc. Artificial intelligence is emerging as an integral part of business at present and continues to do so in the future, making it an irreversible process. (Barrett et al., 2019). Due to the implementation of new technologies in the realm of neural networks, the areas of its influence include drilling and business. It has impacted our cognition, education, work, and living in a world that is intelligent and interconnected (Shuang & Pang, 2023; Kuo et al., 2021; Vendraminelli et al., 2022; Zheng et al., 2023; Doncieux et al., 2022; Hassan et al., 2022). AI integration at tertiary level retained rapidly in the previous five decades (Chu et al., 2022), and multiple innovative intelligent retrieval aids are reported accessible. Although previous work from Chen et al. (2020). Crompton et al. (2020, 2021). indicate and describe this potentials of robotics within HE for equally teachers and learners. This involves: AI within urged employed in further education for personalizing instructions and directed toward cater for different learner types (Verdú et al., 2017), for immediate and precise response in assessment conduction and for analyzing learner success rates. All developed and developing countries' governments seek to improve education quality. This can be accomplished by utilizing modern technologies such as artificial intelligence (Cremer & Bettignies, 2013). Governments around the world are increasing their investments to broaden the spectrum of higher education through the use of new technologies by educators as well as learners (Buckner, 2011). This will help to adopt AI for increasing the quality of educational institutions (Bonder et al., 2001).

### **Problem Statement.**

The application of artificial intelligence apparatuses at the graduate level could revolutionize the learning experience by providing personalized, efficient, and accessible opportunities for learning. However, there has been little research on how these tools improve learning outcomes, what benefits they provide to students, and what difficulties they bring. Specifically, it is necessary to find out how these Artificial Intelligence technologies may effectively support and enhance learning, what unique benefits they provide to students, and what difficulties and restrictions come with their use. That is why the current research study intends to see how Artificial Intelligence tools enhance student's learning at higher education level.

### **Research Objectives**

1. To determine how artificial intelligence tools, such as chatbots plus chatbots can improve students' learning at higher levels of learning

### **Research Questions**

1. What part do artificial intelligence tools play in improving higher education student learning?

### **Literature Review**

AI tools have become crucial in the present higher learning institutions as they improve learning, and make education personalized, more accessible, and efficient. These include adaptive learning platforms, chat bots, and virtual tutors, which enhance the teaching and delivery of details, by addressing the specifics of a learning learner and presenting learning content in a Luganda, which the learner finds appropriate and convenient for learning. Moreover, AI integrated in the educational process enables assigning routine tasks like grading to the algorithm or performing chat bots actions and thus reducing instructors' work time for more essential tasks and focusing on the students' interest. However, the custom of Artificial Intelligence in upper learning organizations devises its challenges that include, Data Privacy and Ethical Issue as well as Equitable Access. AI needs big data, thereby raising concerns about data privacy and potential for prejudice against particular student populations. Another challenge is that overemphasizing the notion of AI may lead to depersonalization and devaluation of the human factors which are crucial

in the learning process including guidance. Hence, though AI is capable of enhancing higher learning in a very distinctive way, its integration into higher learning practice should be done with some measures to enhance ethical practice and inclusiveness in order to enhance positive learning among students. AI went an extended approach in enhancing the scientific or engineering fields due to the development of the computer architecture. AI can be explained as “John McCarthy, a computer scientist, first used the term "the technical and scientific process of making smart devices" in 1956. (Singh et al., 2013). As stated by Smith, this definition encapsulates the practice and science involved in designing systems with the capacity to observe their environment and act in ways that offer the potential for success. AI is defined as the attempt to create intelligent systems, or in other words, systems that can learn, decide, and reason. Artificial intelligence (AI) involves the use of data processed by computers and other machines and other smart devices that perform duties that require intelligence and critical thinking (Jain & Jain, 2019). It differentiates between weak AI, which aims to mimic human intelligence, and strong AI, which focuses on specific functions (Bartneck et al., 2020).

### **Research Methodology**

The research methodology is based on qualitative method.

### **Qualitative research**

Qualitative Research is a methodological approach that focuses on analyzing analysis of complex facts, experiences and views. Qualitative design is selected as the study is interested in understanding the variations in the student’s experiences with AI tools thereby focusing on the interpretation of qualitative data and not a quantitative data. This design enables the identification of recurring codes and themes in students' feedback, aligning with the use of thematic analysis.

### **Population of the Study**

The targeted population was the Undergraduate and Post graduate students of Air University, Islamic University and NUML university of Islamabad. The graduate and undergraduate students studying Education, English and Psychology in these universities of Islamabad.

**Table: 3.1**

<b>Category</b>	<b>Details</b>
Location	Islamabad
Institute	Air University, NUML, Islamic University
Level of Study	Graduate/Post Graduate
Discipline	Arts and Humanities

### **Sample of the Study**

The researcher chooses a purposive sampling technique to collect the data. The sample of this study was graduate and under graduate students because they were familiar with the Artificial Intelligence (AI) tools. The 30 students selected from the three universities represent this larger population. This small group of sample represents the population.

<b>Participant</b>	<b>Gender</b>	<b>Institute</b>	<b>Area of Study</b>
1	Male	AU	UG
2	Male	AU	UG
3	Female	AU	UG
4	Female	AU	UG
5	Female	AU	UG
6	Male	AU	PG
7	Male	AU	PG
8	Male	AU	PG
9	Female	AU	PG
10	Female	AU	PG
11	Female	IIUI	UG
12	Female	IIUI	UG
13	Female	IIUI	UG
14	Female	IIUI	UG
15	Female	IIUI	UG
16	Female	IIUI	PG
17	Female	IIUI	PG
18	Female	IIUI	PG
19	Female	IIUI	PG
20	Male	IIUI	UG
21	Male	NUML	UG
22	Female	NUML	UG
23	Female	NUML	UG
24	Female	NUML	UG
25	Male	NUML	PG
26	Female	NUML	PG
27	Male	NUML	UD
28	Female	NUML	PG
29	Female	NUML	PG
30	Female	NUML	PG

### **Sample and Population**

The current study used purposive sampling to select participants who have been working in academia and have knowledge with artificial intelligence tools. One non-probability sampling method is purposeful sampling where members are selected according to particular traits that align with the enquiry objectives. Here, all participants were university students who had used AI tools in their academic activities. A total of 30 students from these universities in Islamabad were selected for the study. The universities include are Air University, International Islamic University and NUML. This sample size is sufficient to present a variety of perspectives while remaining manageable for thematic analysis.

### **Data Collection Method**

An open ended questionnaire was electronically shared to students of various disciplines and the data was collected. The questionnaire contained open-ended questions aimed at gathering comprehensive responses regarding trainee procedure regarding artificial intelligence implements in their learning academic environment. A detailed analysis of themes related to learning difficulties and enhancement is made possible by the data gathered from 30 participants, which

offers significant qualitative insights into the function of computational intelligence in the educational environment.

### **Data Analysis Method**

The study of themes, as it is proposed by Clark as well as Braun (2006) in this study for examine qualitative information gathered from the questionnaire. The theme analysis is the process of identifying, analyzing, and summing up associations (themes) in information collected. Students' experiences with AI tools were carefully explored into the following studies on the effectiveness about auto tools in improving university-level enhancement. The following phases listed below have been used to examine the data.

### **Clark's and Braun's (2006) Six-Step Method for Assessing Data**

To find significant trends and themes in the data, the six-phase categorization methodology for thematic evaluation will be implemented (Braun & Clarke, 2006). The processes are:

1. Data acquaintance.
2. Code generation.
3. Putting scripts together to create themes.
4. Examining the topics.
5. Assess the topics' importance.
6. Presenting the results.

The data is analyzed by using the thematic evaluation of Braun, Clarke which provides the methodical process for finding, evaluating, and summarizing trends (themes) throughout qualitative document. Such a strategy entails getting to know the data, creating preliminary codes, looking for themes, screening themes, recognizing and categorizing ideas, and creating the final version of the shot.

### **Identifying Themes from Data**

The process of identifying themes from the collected data involved a systematic approach to coding and categorizing the students' responses. Initially, familiarizing assimilates the information by carefully perusing through all responses towards understand the overall context helped in assigning codes to significant statements and phrases that appeared relevant to the research objectives. After that, the codes were examined and improved to make sure they appropriately represented the data. Next, patterns or similarities among the codes assists in grouping them into potential themes. This involved looking for recurring topics, sentiments, and experiences shared by the students. For example, many students frequently mentioned the benefits of self -regulating instruments in terms of improving wisdom efficiency and providing personalized support. Similarly, worries regarding issues of integrity and confidentiality were frequent topics that emerged from the data. By reviewing and refining these groupings, researcher was able to identify different melodies which summarized the main conclusions from the data. The thematic analysis not only highlighted the prevalent experiences and perceptions of students regarding AI tools but also provided a structured framework for discussing the various impacts and AI's effects on colleges and universities.

### **Accessibility and Efficiency (Theme I)**

#### ***Identified Codes in theme (I)***

- Instant Access,
- Time Management
- Efficiency
- Improved Performance

AI tools such as Chat GPT, Grammarly, and Quiltbot significantly enhance the accessibility of information and improve the efficiency of learning processes. These tools provide instant access to a vast amount of data, enabling students to quickly find answers to their questions and summarize long articles, which otherwise would take much longer if done manually.

- *Chat GPT: Assists with quickly finding relevant material. However, it seems that it may be used to illustrate papers, etc., and I would like to try using it for editing material.*
- *Quiltbot: This assists with converting lengthy paragraphs into brief summaries. I interpret the meaning of text easily.*
- *Grammarly: I use it due to giving writing instant feedback on grammar and style. My vocabulary is getting improved by using it.*

Students have highlighted that AI tools are essential for managing their time effectively. For instance, Chat GPT allows students to quickly access widespread explanations of complex topics, reducing the need for prolonged research sessions. This efficiency helps students in in-depth study and better preparation for exams. Furthermore, Youngsters benefit from Grammarly immediate time writing support. produce high-quality assignments with fewer errors and improving their academic performance. The accessibility and efficiency provided by AI tools reduce the time students spend on searching for information and editing their work. This enables them to spend more time to understand and apply the knowledge they acquire. This, in turn, enhances the learning outcomes and performance of students at a wider level. also promotes learning which is valuable.

### **Enhanced Personalized Learning (Theme 11)**

#### **Identified Codes in theme 11:**

- Instant Feedback
- Academic Support
- Learning Gaps
- Enhanced Writing
- Improved Academic Skills

One of the most significant themes identified from the data is the advantage of using tackles based on advancement in learning. Scholars consistently highlighted how tools like ChatGPT and Grammarly enhance their learning experiences by providing instant feedback and personalized support. For instance, several students reported that ChatGPT helps them quickly search related material and come up with concepts for essays and study papers. The ability of ChatGPT to provide comprehensive explanations and instant feedback significantly improves students' understanding of complex topics, resulting in enhancing their academic perform Moreover, the personalized assistance provided by AI tools ensures that students receive adapted support, which is crucial for addressing individual learning needs. This shows that personalized AI-driven learning environments lead to better academic outcomes and increased student satisfaction. This is evident from the student feedback, where tools like Grammarly and Quiltbot were praised for their ability to improve writing quality and provide instant grammar and style suggestions. These tools not only help students produce high-quality assignments but also enhance their overall writing skills, which are essential for academic success. Participants stated that, among other things, ChatGPT and Grammarly helped them with their academic endeavors by offering advice, hints, and writing guidance. They highlighted how useful GPT is in helping them with their courses of study.

- ChatGPT: "Provides personalized help, making it easier to understand difficult concepts."
- "I used it because it is logical and practical, especially when looking up related sources."
- "All of the inquiries would have been replied on ChatGPT, and I initially used it to help me write my preliminary presentation."
- Grammarly: "Improves my writing by offering different writing suggestions."

Personalized learning through AI tools satisfies addressing different wants and requirements of adolescents. This tailored approach guarantees that everyone who learns gets the specific assistance they require, which can significantly enhance their learning experience. For instance, a student struggling with complex programming concepts can use ChatGPT to break down these concepts into more understandable parts, thereby facilitating better comprehension. Similarly, Grammarly's personalized feedback helps students identify and correct frequent errors in their writing, leading to continuous improvement. Personalized learning supported by AI tools assures that children get the individualized attention they need on the way to excel in their studies. The procedure additionally strengthens engagement and motivation yet also stimulates a deeper understanding of the subject matter. By addressing individual learning gaps, AI tools help students achieve their full academic potential.

### **Enhanced Academic Performance (Theme III)**

#### **Identified Codes in Theme III:**

- Objective Assessment
- Continuous Improvement
- Feedback
- Improved Problem-Solving Abilities

AI tools also play an important role in improving assessment and grading processes. Students highlighted that AI-driven assessment tools provide more objective and consistent evaluations compared to human graders. This reduces the risk of human bias and ensures a fairer evaluation process, which is crucial for student development. The data indicates that students appreciate the prompt feedback provided by AI tools, as it helps them understand their mistakes quickly and improve their performance. The utilization of knowledge engineering is closely connected to improved academic performance. These tools provide accurate information, aid in problem solving, and offer comprehensive explanations of complex topics. Students have reported better grades and a deeper understanding of their subjects due to the use of AI tools.

- *"My grades have improved since I started using AI tools."*
- *"AI tools help me understand and solve difficult problems quickly."*
- *"I primarily use ChatGPT to guide me with exploring and coursework."*
- *"It's an excellent resource for finding quick answers to problems or improving comprehension of a certain subject."*

AI tools like ChatGPT and Grammarly play a crucial role in enhancing academic performance. For example, ChatGPT's ability to provide detailed explanations and step-by-step solutions to problems helps students grasp difficult concepts more easily. Grammarly, on the other hand, ensures that students' written work is clear, concise, and free from grammatical errors, which contributes to higher grades in written assignments. The instant observations given by these tools permits learners to learn from their mistakes and improve continuously. Individuals gave more weight to ChatGPT's educational and helpful functions and AI tools may speak for themselves and engage that it empowers them in achieving successful educational outcomes goals. AI tools contribute to better academic performance by offering reliable and detailed explanations, facilitating problem-solving, and high-quality written work. These tools help students achieve higher grades and a better grasp of their coursework, which is essential for academic success.

### **Career Preparation and Skills Development (Theme IV)**

- Development of Practical Skills
- Bridging Academia
- Professional Skills
- Personalized Career Guidance

A key concept which was highlighted from the data that immediate feed backers are helping students prepare for their future careers by enhancing their skills and providing relevant knowledge. ChatGPT is highly effective in giving students access to practical advice, helping them build essential skills like Creative thinking, and figuring out solutions, and communication, which are the entirety vital in career success. ChatGPT helps students bridge the gap between what they learn in their academic courses and the skills needed in professional environments. By offering instant guidance on various topics, it helps students better understand real-world applications of their studies, preparing them for challenges they will face in the job market. This makes ChatGPT a valuable resource in career readiness and professional development. ChatGPT is highly effective at helping students improve their problem solving skills by providing quick answers and detailed explanations to difficult questions. When students face complex problems, whether in assignments or practical situations, ChatGPT assists them by breaking down the issue and offering clear steps to solve it. This not only helps students complete their tasks but also builds their confidence in handling challenges independently.

- *"ChatGPT helps me solve difficult problems quickly, which makes me more confident in my abilities."*
- *"ChatGPT helps me improve my writing by giving suggestions on grammar and structure, which makes my assignments better."*
- *"ChatGPT helps me prepare for interviews and gives me tips on how to present myself, which makes me feel ready for my future career."*

The significant benefit of ChatGPT is its ability to enhance students' communication and writing skills. Many students use ChatGPT to get feedback on their writing, such as structuring assignments, improving grammar, and clarifying ideas. This helps students develop clear and effective communication, which is essential in both academic and professional settings. ChatGPT also plays an important role in helping students prepare for their future careers by offering guidance on professional development.

## **Development of Critical Thinking and Creativity (Theme VI)**

### **Identified Codes in Theme VI**

- Independent Thinking
- Creativity
- Exploration

AI tools also stimulate critical thinking and creativity by providing diverse perspectives and encouraging students to explore various solutions. They enable learners throughout gaining a more profound comprehension of subjects and enhance their problem-solving skills.

- *"AI tools broaden my thinking and help me explore new ideas."*
- *"Using AI tools has improved my creativity and critical thinking skills."*

AI tools like ChatGPT motivate pupils to exercise critical thinking and creatively. For instance, generative artificial intelligence could present multiple viewpoints on a topic, prompting students to consider different angles and develop well-rounded arguments. Quillbot's ability to paraphrase text in various styles also encourages students to think creatively about how to express their ideas. These tools promote a setting in which students actively participate in their education rather than merely receiving knowledge passively. AI tools contribute to the overall intellectual growth of students. This development is crucial for students to excel in their academic and professional lives.

## **Enhanced Research Efficiency and Exploration (Theme IX)**

### **Identified Codes in Theme IX**

- Time-Saving in Research
- Broadening Research Horizons

- **Enhancing Academic Writing**

The overall theme emerging from the data is that AI tools significantly enhance research efficiency and broaden students' exploratory capabilities. Participants reported that AI tools, such as ChatGPT, Grammarly, and Quillbot, save time by providing quick access to relevant literature, references, and comprehensive information, which reduces the effort required for manual searching. AI tools also facilitate the paraphrasing of complex texts, assisting in literature reviews and improving the quality of academic writing. Additionally, AI tools were noted for promoting diverse ways of thinking and offering multiple perspectives on research topics, which helped students broaden their research horizons. However, some students voiced doubts on the precision and dependability of AI-generated content, emphasizing the need for verification and critical evaluation to ensure the information is accurate.

- *"AI tools help in reducing time consumption in searching specific articles."*
- *"They broaden the spectrum by giving multiple ways to think on a specific topic."*

This theme highlights how AI tools not only improve efficiency in conducting research but also expand the scope of exploration for students, making the research process more comprehensive and dynamic.

### **Conclusion**

In conclusion, in higher education learning of AI tools plays a vital role with respect to improves accessibility assistive person and variety of supporting based on personal needs which improve human skills. Ethics is one area that requires consideration in regard to integration of AI because it concerns moral standards of a society, reliance relates to trust which also requires to be considered within an organization while critical thinking is another concern of integration of AI. By directing AI form chaotic learning aid to a more structured tool, universities will ensure people will not use it as an alternative to normal classes. This research looks on the position of the automatic tools enhancing the erudition in the sophisticated learning institutions, revealing that, although these are beneficial in enhancing the learning experience, there are some challenges that come with it. In the course of the qualitative proof gathering, it was identified that current solutions like ChatGPT, Grammarly, and QuillBot are particularly helpful for students as they help to make knowledge more accessible and learning processes more effective. These results are in line with the modern trends in Education wherein technology is used to complement the lack of differentiation in learner pathways for students to get immediate feedback and develop their skills independently (Holmes et al., 2021; Luckin, 2019). These are also useful to facilitate skills for employability that should be developed for career preparedness. In regard to this, the skills such as humanities skills, digital skills, communication skills, and flexibility are highly valued at the present time as the digital environment progresses daily in giant steps. Language skills, numeracy, tackling issues and critical rational that needed at the workplaces are supported by the AI instruments (Chen et al.,2020; Roberts et al., 2022). These skills also ensure that there is a clear linking behavior of the student from the academic practice towards technological oriented careers.

### **Recommendations**

- Universities need to work with AI developers to routinely update tools based on user feedback, addressing potential ethical concerns while increasing the tools' relevance and accessibility.
- For universities to get the most out of AI tools they need to provide their students with digital literacy sessions that would explain to them the finer details or the higher levels of functionality of these AI programs. This training includes elements like understanding the limitations of AI, as well as utilization of AI tools without orienting one's work fully around them.

- In their classrooms, teachers may find themselves limitation AI usage in their courses to prevent learners from fully depending on its assistance They may design assessments in a way that makes students engage in self-sourced questioning and analyzing.
- Institutions require developing strategies in addition to guiding principles for the ethical uses of AI tools and where these issues relate to: academic integrity, originality and/or responsible usage. Over aspects such as recognizing AI’s limitations, and using AI tools without over-reliance.
- Educators need to supervise AI use in coursework to avoid over-reliance and dependency They may develop tests that promote self-directed inquiry and problem-solving, reducing students' reliance on AI.

## References

- Barrett, M., Branson, L., Carter, S., DeLeon, F., Ellis, J., Gundlach, C., & Lee, D. (2019). Using artificial intelligence to enhance educational opportunities and student services in higher education. *Inquiry: The Journal of the Virginia Community Colleges*, 22(1), 11.
- Bartneck, C., Lütge, C., Wagner, A., & Welsh, S. (2020). *What is AI? An introduction to ethics in artificial intelligence*. Springer.
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*, 8, 75264–75278.
- Chu, H. C., Hwang, G. H., Tu, Y. F., & Yang, K. H. (2022). Roles and research trends of artificial intelligence in higher education: A systematic review of the top 50 most-cited articles. *Australasian Journal of Educational Technology*, 38(3), 22–42.
- Crompton, H., Bernacki, M., & Greene, J. A. (2020). Psychological foundations of emerging technologies for teaching and learning in higher education. *Current Opinion in Psychology*, 36, 101–105.
- De Cremer, D., & de Bettignies, H. C. (2013). Pragmatic business ethics. *Business Strategy Review*, 24(2), 64–67.
- Doncieux, S., Chatila, R., Straube, S., & Kirchner, F. (2022). Human-centered AI and robotics. *AI Perspectives*, 4(1), 1.
- Hassan, R., Ali, A., Howe, C. W., & Zin, A. M. (2022). Constructive alignment by implementing design thinking approach in artificial intelligence course: Learners’ experience. In *AIP Conference Proceedings* (Vol. 2433, No. 1). AIP Publishing.
- Holmes, W., & Tuomi, I. (2021). State of the art and practice in AI in education. *European Journal of Education*, 57(4), 542–570.
- Jain, S., & Jain, R. (2019). Role of artificial intelligence in higher education—An empirical investigation. *IJRAR-International Journal of Research and Analytical Reviews*, 6(2), 144–150.