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Usage of Artificial Intelligence among Research Scholars at Higher Education Level

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Abstract

This study explores the usage of Artificial Intelligence usage among research scholars in higher education, emphasizing critical thinking, creativity, and academic productivity. It addresses rising concerns about AI tools such as ChatGPT, Grammarly, and Mendeley potentially undermining cognitive autonomy and the scholarly integrity of academic work. While these tools assist with literature review, academic writing, and data analysis, excessive reliance may weaken higher-order thinking and independent problem-solving skills. A quantitative research approach, guided by the Artificial Intelligence in Education (AIED) theoretical framework, was adopted using a descriptive research design. The study surveyed 136 eighth-semester students from the B.Ed. and BS Health & Physical Education programs at the National University of Modern Languages, Islamabad, and the International Islamic University, Islamabad, Pakistan. Data were collected using a self-developed 21-item questionnaire based on a 5-point Likert scale, assessing students' perceptions across three core domains: Cognitive Enhancement and Analytical Thinking, Creativity and Idea Development, and Academic Writing and Productivity. Data analysis was conducted using descriptive statistics and independent sample t-tests through SPSS. The findings revealed moderate to high AI usage, with participants generally reporting favorable perceptions of AI's role in supporting their cognitive and academic tasks. Nevertheless, the statistical findings showed that there were no significant differences in cognitive impact according to academic discipline or gender and thus the null hypothesis was retained. The report finds that AI can positively impact academic performance without reducing cognitive autonomy when utilized in a responsible manner. However, the moral aspect of use and overreliance raises the issue of formal AI literacy. It proposes the inclusion of AI ethics and critical engagement strategies in higher education.

Keywords: Artificial Intelligence, Higher Education, Research Scholars, Cognitive Effects, Critical Thinking, Creativity, Academic Productivity, Cognitive Autonomy, AI Tools, AI in Education (AIED).

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Introduction

The past decade has seen Artificial Intelligence (AI) becoming one of the more radical technologies in higher education and research. Firstly, inspired by the work of Alan Turing on machine-based reasoning (Cristianini, 2016), AI has changed to become a disruptive technology that can simulate human-like processes, such as learning, adapting, reasoning, and problem-solving (Popenici et al., 2017). In recent years, AI technologies have become common in the educational and research processes as they enable the teaching, learning, and construction of knowledge. Their popularity is increasing rapidly, because of the rapid advancement of information and communication technologies (Alajmi et al., 2020), which make AI more accessible in various spheres and domains. In higher education, AI is implemented not only in education and in assessment, but also in the efficiency of research. It has been reported as being helpful in creating personalized learning plans, providing feedback in a timely manner, aiding in test development, as well as forecasting academic success (Cagatayli and Celebi, 2022; Crompton et al., 2021). In addition to instruction, there is another application of it that scholars have named, which is useful to researchers in carrying out not only critical academic functions but also data analysis, literature review, writing scientific papers, and predictive modeling (Underwood and Luckin, 2023). AI automates complicated processes to improve quality, efficiency, and collaboration in research within education, health sciences, engineering, and social sciences. Therefore, AI is becoming a key driver of academic scholarship innovation.

While these benefits may be achievable, its presence in the research environment also raises the question of its implications in terms of cognition and education. According to a few studies, The efficiency of the intellect of artificial intelligence could increase, but in one way, overreliance could ruin the intellect of higher order. As an example, Zhou et al. (2024) emphasize that the students at the university who overuse AI tools are less innovative and original in their thinking. Likewise, in their research of Pakistani university students, Hasan et al. (2024) found that collaboration, innovation, and critical thinking declined with the help of AI. It is referred to as cognitive offloading and the use of AI decreases the amount of mental power in Jose et al. (2025), although it affects the long-term memory and problem-solving abilities adversely. These developments indicate the possibility of the excessive use of AI to eliminate the intellectual ability that university education is supposed to imbue in learners of critical thinking, free thinking, and creativity. According to Hrastinski et al. (2019) and Zawacki-Richter et al. (2019),

additional studies regarding the use of AI to identify the practices and intellectual outcomes of higher education are needed. Whereas the literature on the question of AI as pedagogical aid is abundant, little has been studied on the question of AI and its impact on the cognitive aspect of research scholars which is the most advanced form of academic research. The knowledge creators are expected to be Research scholars and demonstrate originality, scholarly rigour, as well as independent thinking. Once the interference of AI in these features is achieved, the impact may be redirected to the rest of the scholarly and scientific community. It is in this regard that the current study aims to examine the effect of these AI tools on the cognitive abilities of the research scholars in higher education. Using the framework of Artificial Intelligence in Education (AIED), this research paper will explore the notion of whether AI can support or suppress critical thinking, creativity, and academic performance. By filling this gap, the study will aim at adding empirical data to the ongoing arguments on the use of AI in higher education, specifically in terms of its role in maintaining intellectual autonomy and academic excellence, with its benefits.

This research investigated the cognitive impact of the use of AI among research scholars based on the parameters specified in the AIED model. Since the problem of augmenting or diminishing certain mental abilities of critical thinking, analytical thinking, and independent decision making has been addressed, the research has escalated the theoretical implementation of AIED to a personalized level. Cognitive development is the field into which learning and automation are transferred. The results will help the researchers to understand the place of AI technologies in the mental activities, which appear only in the most progressive academic atmosphere, and provide suggestions that organize future research on the responsible and efficient use of AI in higher education. It will provide the groundwork of the empirical study that will explore the practical advantages as well as possible limitations or hazards of applying AI to high academic standards.

Practically, the subsequent implications of the findings of this study on teachers, schools, and policymakers would illuminate the opportunities and problems of AI application in the research context. It would show the teachers that AI can be employed to facilitate and not replace intellectual processes and may inform creation training programs and guidelines to help make AI use balanced. Probably, the findings would aid in addressing or controlling real educational issues like technological overuse, decreasing academic integrity or critical thinking. In policy issues, the study would enable knowledgeable decision-making concerning the incorporation of AI in the learning process and even help in the conceptualization and creation

of institutional frameworks that would safeguard academic standards and, at the same time, be novel. Overall, this study can improve the quality of academic practice, and intellectual growth, and lead to the development of AI-based learning and research areas.

Literature Review

The rapid growth and implementation of Artificial Intelligence (AI) into higher education have transformed the essence of research radically and have become subjects of rising research interest regarding its possible effects on scholarly practice. The potential of AI tools, including ChatGPT, to facilitate productivity, efficiency, and access to information in research, is discussed in existing literature. However, concerns remain about their cognitive and ethical impact, particularly on critical thinking, creativity, and academic integrity. This literature review examines recent studies on AI usage in higher education, specifically focusing on research scholars, highlighting emerging trends, benefits, challenges, and the urgent need for targeted AI literacy.

AI's Expanding Role in Academic Research

It was in 1956 when the field of artificial intelligence became a discipline (Hamet & Tremblay, 2017). Nevertheless, in November 2022, ChatGPT entered the advanced model range of generative AI, which marked a historic moment in the industry. Though the full potential of generative AI as an educational application remains to be explored (Zawacki-Richter et al., 2019), the same thing is certain under the existing awareness in augmenting adaptive learning, scientific research, and knowledge management (Razia et al., 2023; Rind et al., 2024). The paper is a systematic literature review of databases like Scopus and Web of Science to review the effect of artificial intelligence on scientific research at the higher education level. Such sites are chosen due to their stringent peer-review procedures, which guarantee the quality of the information which was examined. Also, this is the work that is supposed to investigate the new directions of research, and discuss the advantages and disadvantages of AI, which is mostly focused on the ethical side of it. It also examines the above benefits of the proposed technology at various research levels.

The Transformative Role of AI Technologies

The implementation of AI-based technologies like ChatGPT is gaining momentum and offering. that provides natural language processing with a fresh

start and allows to analysis the data more efficiently, conceptualization of hypotheses, and research papers (Dergaa et al., 2023). AI was an academic revolutionary because of proposed monumental differences in approaches, refining data processing abilities, and established more research and scientific writing in other disciplines (Macdonald et al., 2022). It is now possible to support finance with AI ideas on research and assist with data analysis. noted by Dowling and Lucey (2023). In the same way in the health sciences and elsewhere, it is used with data, which is processed, predictive analytics, and experimental design. Even paradigms, despite being problematic in the context of ethical issues as Crawford et al. (2023) discuss, are problematic.

The dilemma of Open Ends in AI-led Research, Innovation versus Ethics.

The academic world is still struggling with the opportunities, as well as the challenges they present. questions are asked, the perpetual need for research is put in a fresh perspective. Unresolved questions concerning the application scalability of AI applications, ethics, and compromises between the AI-enhanced performance and human resourcefulness in scientific. Research indicates that the possibility of using AI to revolutionize university research must be viewed as an opportunity which must be taken into account. subtlety. In this sense, this review critically discusses the two sides of the coin posed by AI, to name but a few, Kooli (2023) strongly highlights the need to monitor the procedures in which AI is used. is undertaken to prevent the formation of fraud.

Global Expansion of AI Literacy in Higher Education

The application of artificial intelligence (AI) in higher learning has increased in the recent past as awareness of AI's capabilities to increase research productivity, efficiency, and academic work has grown. This growth is mirrored in global efforts to improve AI literacy at multiple learning levels. Although national plans in the US (National Artificial Intelligence Initiative Office [NAIIO], 2021), China (Ministry of Education of the People's Republic of China, 2019), and Germany (Federal Ministry of Education and Research [BMBF], 2021) highlight AI education at the higher and adult education levels, global initiatives like AI4K12 (Touretzky et al., 2019) target school-level AI literacy.

The Increasing Interdisciplinary AI Literacy among Research Scholars.

These efforts define the need to equip future researchers to implement

AI in their work and studies successfully. As an example, Aulenkamp et al. (2021) posted a range of projects that were dedicated to the implementation of AI beyond the information technology field, including medicine, business administration, and training teachers (Vazhayil et al., 2019). This shift in favour of the proliferation of AI literacy among scholars in every discipline indicates the increasing necessity of interdisciplinary capability in AI (Xu and Babaian, 2021).

Technical Skills for Research Scholars

Technical capability is not all AI literacy of a research scholar. Ng et al. (2021) states that critical thinking of the output of AI is no less critical than technical knowledge. Similarly, Long and Magerko (2020) indicate that being AI literate does not require an individual to be knowledgeable in computer science or programming skills. Instead, researchers would have to train to interpret and evaluate AI tools. It is particularly relevant to scholars who consider such domains as the social sciences and humanities, where AI technologies are becoming a widespread tool in data analysis, literature summaries and writing of academic papers.

Structural Variations in AI Literacy Programs Across Educational Levels

Apart from the increasing emphasis on AI literacy, there exist structural and content-related differences in various AI literacy initiatives. For example, AI training for novice adult learners like scholars at a university tends to come in the format of versatile, web-based courses like those from websites such as AI Campus and Elements of AI. Conversely, AI education for younger learners tends to be more hands-on and project-oriented, given that they have limited experience with abstract or mathematical ideas (Yang, 2022). For scholars in higher education, AI courses are now designed more to meet professional demands so that they will be effective users of AI tools in academic research environments.

Aside from increasing emphasis on AI literacy, there are content and structural differences among various AI literacy programs. For example, AI education for novice adult learners, such as university researchers, typically appears as adaptive, online courses like those provided by sites like AI Campus and Elements of AI. Conversely, AI training among younger students is generally more practical and project-oriented, considering that they have little experience with abstract or mathematical concepts (Yang, 2022). For university researchers, AI courses are now

more geared towards professional purposes, making them better-equipped users of AI tools in research contexts.

Limited Empirical Evidence on AI Literacy

Although there has been growing interest in AI literacy, there are still limited empirical studies concerning AI literacy among specific population groups especially the university research scholars. Ng and colleagues (2021) conducted a review of the literature on AI literacy in general, whereas Long and Magerko (2020) tried to create universal AI literacy. Still, the lack of literature on AI literacy among research scholars is obvious. As AI gains more popularity in the field of data analysis, academic writing, and planning of a research project, the question of how researchers learn to work with and evaluate AI tools more critically arises. The disparity leads to the need to conduct more specific research that would address specific segments of the population, e.g., university research scholars who are not necessarily digital natives (Bennett et al., 2018), yet who would have to be capable of implementing AI into their academic endeavors intuitively.

The Cognitive Implications of AI in Research

The augmented role of AI as a research instrument, be it data analysis or the writing of the manuscript and literature mining, will have to be sought through time in discovering how the tools will influence the research productivity, efficiency and cognitive performance of the researchers. Some of the advantages of the adoption of AI are more efficient research.

Knowledge and increased productivity, but instills fear of dependence on technology that is unhealthy to innovation and critical thinking and solving problems alone. The focus on AI literacy or other programs should be noted to set scholars who are not only able to access the tools of the AI-based methods but also interpret and comprehend the implications in their field of study (Long and Magerko, 2020).

Investigating the Cognitive Impact of AI on Scholarly Practice

The growing body of AI research in the higher education setting is the foundation to further studies on the specific role of AI tools in research scholarship, namely how scholars would include these tools in their study and the cognitive effect of doing so. As the number of AI software available in the research setting continues to rise, understanding the influence on academic practice, including critical thinking, creativity, and

research quality, will be relevant to guide future AI implementation in academic research (Ng et al., 2021a).

Theoretical Framework

Underwood and Luckin suggest that the AIED model offers a robust theoretical foundation to explore and examine how AI can be used by research scholars in the field of higher education (Underwood and Luckin, 2011). The model is pedagogical and technological in nature and based in computer science, educational psychology and cognitive science. AIED is concentrated on supporting real-time learning and various learning settings, with the help of intelligent, adaptive, and personalized systems.

Key Components of the AIED Model Relevant to the Study

Learner-Centered Design

AIED promotes the use of learner-focused systems that adapt to the individual preferences, mental states, and learning requirements of each learner. Student-centered design in this research explains the way AI technologies such as chatbots, writing assistants, or intelligent search engines are tailored to study students based on their area of study, research aims, and learning style (Underwood & Luckin, 2011, p. 6).

Intelligent Tutoring Systems (ITS)

AIED focuses on intelligent tutoring systems that replicate human tutors through the provision of feedback, direction, and scaffolding throughout learning. These systems offer customized support and real-time adjustments as per the user's behavior. ITS is an imperative tool for this study, analyzing how research scholars leverage tools augmented by AI to improve their critical thinking and knowledge acquisition (Underwood & Luckin, 2011, p. 14).

Metacognitive Support

Metacognitive support is one of the main roles of AIED tools, facilitating learners to become aware of their progress, manage their cognitive activities, and build self- awareness. This is specifically applicable when determining whether the use of AI fosters or inhibits cognitive autonomy among research scholars (Underwood & Luckin, 2011, p. 11).

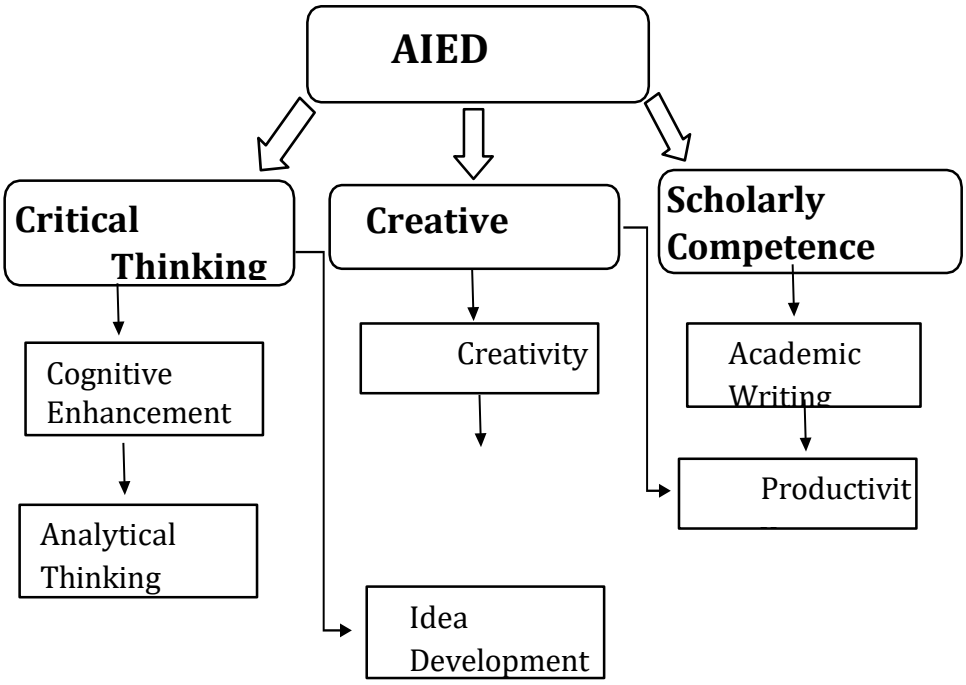
Collaborative Learning with AI

AIED systems are also built to offer assistance for cooperative and social learning using communication channels, group modeling, and feedback mechanisms. For this research, this factor helps analyze how AI enables collaborative research processes among researchers in virtual and interdisciplinary environments (Underwood & Luckin, 2011, p. 12).

Data-Driven Decision Making

AI tools based on AIED provide a high level of data analysis, learning data mining, and pattern recognition to support decision-making and customization. This is also a crucial part of understanding how AI can assist research scholars in terms of conducting literature reviews, analysis, and coming to conclusions regarding future research through the use of bibliometric and analytical tools (Underwood and Luckin, 2011, p. 13).

Conceptual Framework



1.5.1 Conceptual Framework of Usage of Artificial Intelligence Among Research Scholars at Higher Education Level

The conceptual framework was generated from studies of AbuSeileek and Qatawneh (2022), Bašić et al. (2023), Imran and Almusharraf (2023), and Malik et al. (2023).

Research Objectives

The proposed research is expected to explore the application of Artificial Intelligence (AI) in the work of research scholars in higher education and evaluate whether the use of this technology affects their intellectual capacity in various academic courses and across different genders.

1. To determine the extent to which research scholars in higher education use AI tools in their academic research.
2. To examine a significant difference in intellectual abilities between B.Ed. and Health & Physical Education (HPE) research scholars.
3. To analyze a significant difference in intellectual abilities between male and female research scholars in higher education.

Research Questions

Based on the aim of the study, it addresses the research questions:

1. To what extent do research scholars in higher education use AI tools in their academic research?
2. Is there a significant difference in intellectual abilities between B.Ed. and HPE research scholars in higher education?
3. Is there a significant difference in intellectual abilities between male and female research scholars in higher education?

Research Hypothesis

To test the research objectives, the following null hypotheses are formulated

H01: There is no significant difference in intellectual abilities between B.Ed. and Health & Physical Education (HPE) research scholars in higher education.

H02: There is no significant difference in intellectual abilities between male and female research scholars in higher education.

Methodology

This study adopted a quantitative research approach to examine the use of Artificial Intelligence (AI) tools among research scholars in higher education. This method was suitable for collecting numerical data on

students' perceptions of AI tools and their role in enhancing cognitive skills, creativity, and academic productivity. A descriptive research design was employed to investigate patterns of AI applications and analyze its perceived impact on students' cognitive skills, creativity, and academic writing. Descriptive research was considered appropriate because it helps understand current practices and the extent to which AI has been integrated into academic work. The population of the study consisted of 8th-semester research students from the Health and Physical Education (HPE) and Bachelor of Education (B.Ed.) departments at the National University of Modern Languages (NUML), Islamabad, and the International Islamic University, Islamabad. These students were actively conducting research, making them suitable participants. Since the population was small, sampling was carried out using Morgan's Table. Based on Morgan's Table, a sample of 136 was selected from a population of 201 using simple random sampling. A self-developed questionnaire containing 21 items was used as a research instrument to collect data on scholars' perceptions of AI use in academic activities. The items were grouped into three main themes and measured on a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." Content validity of the instrument was ensured through expert review by two academics, and necessary revisions were made based on their feedback. The reliability of the questionnaire was confirmed with a Cronbach's alpha value of 0.9, indicating excellent internal consistency. Data were collected online using Google Forms because many participants were not available in person. Respondents provided answers based on their experiences, practices, and perceptions of AI use in their research work. Ethical considerations such as voluntary participation and confidentiality of responses were maintained throughout the process. Data analysis was conducted using SPSS. Descriptive statistics, particularly mean scores, were calculated to determine the overall extent of AI usage among research scholars. Inferential statistics were applied through the Independent Samples t-test to examine differences in intellectual performance. One analysis compared B.Ed. and HPE scholars to see if disciplinary background influenced cognitive abilities, while another compared male and female scholars to identify any significant gender-based differences. Together, these analyses provided a comprehensive understanding of AI utilization in academic research and its influence on the intellectual capacities of research scholars in higher education.

Results

Table 1 Demographic Characteristics of Study Participants

Variable	Category	Frequency	Percent
Qualification	B.Ed.	92	67.6%
	BS HPE	44	32.4%
	Total	136	100.0%
Gender	Females	106	77.9%
	Males	30	22.1%
	Total	136	100.0%

Table 2: Descriptive Statistics for AI Usage about Cognitive, Creative, and Scholarly Skills(n=68)

Usage of AI	Mean	*SD*	Remarks
Critical Thinking Skills	2.9580	0.567	Students perceived a moderate positive impact of AI.
Creative Thinking	2.9580	0.567	AI was viewed as equally beneficial for supporting creativity.
Scholarly Competence	2.9328	0.500	Slightly less impact perceived on academic writing and productivity

Table 3: Independent Samples t-Test Results for Qualification and Gender Differences in Perceptions of AI's Impact on Critical Thinking, Creative Thinking, and Scholarly Competence

Components	Group	Mean	SD	t	df	Sig
Critical Thinking Skills	B.Ed.	2.9472	0.591			
	BS HPE	2.9805	0.527	0.234	46	0.328
	Females	2.9542	0.569	-0.102	22	0.920
	Males	2.9714	0.579			
Creative Thinking	B.Ed.	2.9472	0.591			

	BS HPE	2.9805	0.527	0.234	46	0.328
	Females	2.9542	0.569	-0.102	22	0.920
	Males	2.9714	0.579			
Scholarly Competence	B.Ed.	2.9006	0.539			
	BS HPE	3.0000	0.408	0.842	53	0.114
	Females	2.9218	0.493	-0.321	21	0.751
	Males	2.9714	0.537			

The research was conducted among 136 participants, most of whom had a B.Ed. degree (67.6, 46 participants), and the rest 32.4% of the participants (22 participants) had B.S HPE degree. Gender distribution was skewed in the sample since 77.9% of the participants were female (53), whereas only 22.1% of the participants were male (15). It demonstrates that the participants of the study were majorly B.Ed. graduates and consisted of a significantly higher proportion of female participants than males.

The research also focused on how the participants perceived the effects of Artificial Intelligence (AI) on their three areas of critical thinking skills, creative thinking, and scholarly competence. The comparison of the mean and standard deviation values showed that the mean score of both creative thinking and critical thinking was the same as 2.9580 and standard deviation was 0.567. This implies that AI was considered to have a moderate impact on these skills and responses were also found to be equally varied. Scholarly competence had a somewhat less mean score of 2.9328 with a standard deviation of 0.500 which also shows a moderate perceived benefit although with more consistent responses among the participants. In general, the results suggest that AI was perceived to have an equally important role in improving all three areas of the skills, with the slight differences between domains.

Independent samples t-tests were done to investigate group differences. To begin with, the similarity between the perceptions of B.Ed. and BS HPE students was very high. The mean of 2.9472 (SD = 0.591) was obtained by the B.Ed. students, and the mean of 2.9805 (SD = 0.527) by BS HPE students, which is high. The t-test (t = 0.234, p =.328) showed that this difference was not statistically significant. The same trend was observed in creative thinking with both groups again recording nearly the same mean values which were supported by the t-test to indicate no significant difference (t = 0.234, p =.328). In scholarly competence, B.Ed. students scored mean 2.9006 (SD = 0.539) as compared to 3.0000 (SD =

0.408) by the BS HPE students. Though there was a slight difference, the difference was not significant (t = 0.842, p =.114) between BS HPE students and the general population. The overall results imply that the two qualification groups did not have significant differences in their opinions regarding the impact of AI.

The second independent samples t-test was to test gender differences. The female students scored 2.9542 (SD = 0.569) in critical thinking skills as compared to the male students who had slightly higher mean at 2.9714 (SD = 0.579). The test gave a t-value of -0.102 and p-value of.920 indicating that there is no significant difference. The same was also found in relation to creative thinking, in which there were almost the same results between both sexes (there was again no significant difference t = -0.102, p =.920). In scholarly competence, the score of females was 2.9218 (SD = 0.493), and males were 2.9714 (SD = 0.537). The t-test value (t = -0.321, p = .751) indicated that the difference was not significant even though males had slightly higher values of mean values.

Overall, the results point to the idea that participants of either gender (male or female) as well as various qualifications (B.Ed. or BS HPE) rated AI as moderately and relatively equally affecting critical and creative thinking and academic competence. The fact that the null hypotheses were consistently accepted by all tests shows that significant differences between the groups were not observed, and students have a widely common opinion about the contribution of AI to each of these areas of skills.

Discussion

The present study examined the perceptions of Artificial Intelligence use on students on how they developed critical thinking skills, creative thinking, and academic competence. The results of the analysis conducted using the answers of 136 respondents indicated that the students rated the influence of AI as moderate in all three areas, with almost equal means of critical and creative thinking and slightly lower but consistent means of scholarly competence. No statistically significant results were found to be different in perceptions according to qualification (B.Ed. vs. BS-HPE), or gender (male vs. female), which indicated that there was a similar perception among the students despite their backgrounds. The instrument was also found to be reliable (Cronbach's Alpha =.923) which provides confidence in the results obtained.

These results are partly consistent with other studies carried out in the same educational setting. As an example, Sternberg (2020) and Kim et al. (2022) studies stated that AI tools, being part of the educational setting, could contribute to critical thinking and innovation by allowing students to search

for information at a more efficient rate and take part in the problem-solving process. The moderate effect found in the current study is like these inferences, which indicate that students are aware of the beneficial effect of AI in improving higher-level thinking ability. Nevertheless, it is worth mentioning the slightly lower score in scholarly competence. Although other articles like the one by Alim et al. (2021) reported high-level gains in academic writing and productivity in the use of the AI-assisted tools like grammar checkers and citation managers, the students in the current study indicated a perceived lower level of influence of AI on academic performance. This can mean that students do not use AI in academic activities well or they do not know about its potential in this field.

Also, the lack of significant differences between genders or academic qualification is aligned with the results of Lee and Wang (2019), who found that there are no substantial differences in the adoption of AI and its perceived usefulness based on demographic characteristics when digital literacy is relatively even. However, other researchers (e.g., Nasir and Rafiq, 2023) have also demonstrated that male students are more inclined to use AI tools when working on research-related assignments, which is opposite to the existing results. This difference might be explained by the composition of the sample since in the current study the percentage of women respondents was much higher, or by different degrees of exposure and institutional encouragement to the use of AI across the programs.

Although the research reflects the overall tendency that AI is seen as helpful in cognitive and creative growth, it also reveals the areas that students especially in scholarly competence, might require additional guidance or resources to utilize AI to its fullest potential. The fact that the perceptions of AI integration in education are, overall, stable and positive among student groups also contributes to the notion that the process has been widely accepted and appreciated, yet additional research is still necessary to comprehend and address any gaps in application and influence.

Conclusion

This study was aimed at investigating the perception of university students about the application of artificial intelligence as an instrument of developing critical thinking, creative thinking, and academic competence. According to the findings, students are willing to have a positive attitude towards AI usage in learning overall. Two out of three dimensions associated with the positive perception of academic competence were critical and creative thinking, which were somewhat more positively perceived than academic competence. Interestingly, these assumptions were not different between academic levels and females, which implies

that the opinions of students about the educational contribution of AI are quite universal and not affected by demographic aspects.

These results are consistent with the current body of literature which identifies a cognitive and creative potential of AI in higher education. The relatively low scores linked to academic competence, however, indicate the potential gap in the knowledge or proper use of AI in academic writing, research, and academic communication. This implies that there should be guided implementation of AI tools and not unstructured or unregulated applications.

According to these results, teachers should incorporate AI-mediated tasks into the coursework by ensuring they encourage critical thinking, originality, and fair usage. The institutions are encouraged to think of providing specific training programs and workshops that enhance AI literacy of students, especially academic writing and research practices. At the policy level, guidelines and ethical codes should be established to facilitate the responsible usage of AI without harming academic integrity.
The current study can be expanded by future theoretical studies on the effect of tools of AI on learning, and experimental or longitudinal research designs could help to learn more about how the continued use of AI can affect cognitive processes and academic outcomes of students in the long run.

Contribution to the Field

This study is a significant contribution to the growing body of literature on Artificial Intelligence in Education (AIED). It presents one of the few empirical studies in the Pakistani higher education setting, providing evidence on how research scholars perceive the cognitive, creative, and scholarly effects of AI tools. Using the AIED framework, the research not only confirms its usefulness in examining AI use but also broadens its utility to undergraduate-level research scholars, who are commonly understudied in global literature. The results present a rich picture: although AI is largely viewed as helpful towards critical and creative thinking, its contribution to developing scholarly ability and enhancing academic writing is only cautiously judged. This finding highlights an important lack of AI literacy and suggests the imperative for focused training initiatives. It also indicates the lack of distinct gender- and field-based disparities against assumptions of relative adoption rates of AI technologies and emphasizes increasing homogeneity of AI applications across different academic backgrounds. Apart from theoretical relevance, the research provides pragmatic advice for universities by suggesting the inclusion of AI ethics and responsible-use methods in curricula, thus informing policy, pedagogy, and future research agendas.

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