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ABSTRACT

The advent of Artificial Intelligence (AI) in all walks of life, notably in education and academic research domain has driven a revolutionary transformation globally, and Pakistan is no exception. AI with its revolutionary drive has opened various untapped avenues for academicians and practitioners, posing certain ethical threats at the same time. The education sector, particularly the higher education sector and the research domain, has now been highly influenced by the use of generative AI and its applications. One strand of research posits that over-reliance on AI use has been crippling the ability of critical thinking of researchers by impacting their cognitive abilities, thus facilitating AI assisted cheating and raising ethical issues, whereas the other mentions that AI as an assistant helps get strenuous tasks done easily. The exploratory two-tier research approach employed in this study aims to address these concerns. The study explores the situation of AI in Pakistani Education system by conducting two Focus Group Discussions with the academics, students and AI specialists. Based on the FGDs, key themes were emerged and they were further triangulated by doing a descriptive survey with the academics and students. The study concludes AI can be a useful partner, if used ethically and in an observant manner. The study stresses upon the capacity building activities and trainings for the usage of AI and generative AI.

JEL Classifications: O300 for Innovation; Research and Development; Technological Change
Keywords: AI, Education sector, Research, Pakistan

1. INTRODUCTION

Since the introduction of computers, the surge for making technology better for people and improving its usage for humankind has led to the advent of Artificial intelligence (AI) that is now in the phase of enhancing lives and also replacing many human jobs with its interventions. Since 1950, AI has been predicted to require a few years to reach human intelligence in cognitive and social aspects (Haenlein & Kaplan, 2019), which after 75 years appears as AI is leading most of life spheres. AI is making particular progress in the banking sector, medicine, meteorology, agriculture, education, and research etc. (Adithiyaa, 2024).

The education sector is crucial for people's well-being and for a country's development. Particularly the individuals who get higher education require to use their critical thinking and their technical learnings for performing daunting tasks that can help a nation progress. The mentioned scenario highlights the importance of education. Alexandara Harry (2025) states that AI has the potential to transform the traditional education, which it is currently doing. It has a tendency to change the means of learning and teaching in an efficient way, using its predictive nature by the use of machine learning and language processing effectively. AI can be helpful in the assessment of students, adaptive learning, personalized learning streams, chatbots, distant and smart learning and even can help in grading the assignments etc. (Adithiyaa, 2024).

The education sector, particularly the higher education sector and the research domain have now been highly influenced by the use of generative AI and its applications.

Generative AI can be revolutionary in the refinement of ideas and literary work of researchers and higher education students but also raises serious questions regarding the accessibility of the generative AI due to digital divide (Yueqiao, 2025), its validity of answers (Kwan, 2025), and the critical thinking ability (Gerlich, 2025). Critical thinking is a significant outcome of higher education and is duly required for the research purposes and deep learning. However, one dangerous aspect of AI is that it may be crippling the ability of critical thinking by impacting their cognitive abilities and helping people in AI assisted cheating (Kwan, 2025), and generative AI ChatGPT and Deepseek etc. are examples of that. Zhai *et al.* (2021) suggest that the research before 2020 has pointed towards the positive impacts of Generative AI. However, it requires reconceptualization from the academics and understanding of the use of AI ethically. Similarly, García-L´opez (2025) has mentioned, based on a systematic literature review, that the use of Generative AI applications has raised concerns over the compromise of ethics in education and has raised the need for AI regulations. Further, the use of AI in developing countries is widespread and beneficial, but it possesses certain risks due to dodgy digital infrastructure and literacy (Folorunso, et al.2024), and with its risk of impacting cognitive processes, it can be a bigger risk. In a country like Pakistan, the use of Generative AI in education and research fields can be harmful in the long run, if not used properly. The students are committing AI-assisted cheating, the ability of researchers and instructors is not up to date to use AI effectively and ethically, which can raise concerns for the future of AI, research and education. Therefore, this study aims to identify the level of use of AI in the education sector and emphasizes its ethical use and possible regulations in the country. The objectives of the research are.

1. How is Generative AI impacting the education and research in Pakistan/ critical thinking of students and researchers?
2. How is AI raising ethical concerns in education and research?
3. Do we need to regulate AI/ Generative AI to mitigate its risks/ ethical concerns?

2. LITERATURE REVIEW

The advent of Artificial Intelligence (AI) in all walks of life, notably in the academic research domain has driven a transformation globally, and Pakistan is no exception. AI possesses a revolutionary force to change the way research has been conducted, delivered, accessed, and managed so far. This section explores the role of AI in the research and education sectors in Pakistan, with a particular focus on its applications and implications in research.

Currently, AI has been gradually being adopted in education and academic research in Pakistan. The educational landscape varies in Pakistan owing to its various socio-economic factors. Thus, integrating AI in education in Pakistan can promise multiple opportunities, particularly in research. AI technologies like Intelligent Tutoring Systems have offered one-on-one support to students, simulated human-like interactions with real-time feedback to promise student engagement and academic performance (Choi, et al.2025; Laksono, et al.2024). AI tools provide adaptive learning platforms for personalized learning experiences, and can be customized as per every individual student needs. Likewise, Generative AI tools like ChatGPT have streamlined instructional processes in education and research by assisting students and researchers in writing and content generation (Choi, et al.2025; Alali & Wardat, 2024).

Extant literature explores the integration of AI in teaching, learning, and research processes (Majeed, et al.2024) and posits positive impact of the use of AI tools on students' academic performance in research work, assignments, and overall assessments (Zia, et al.2024). Existing literature captures the teachers' perspective in terms of the integration of Generative AI (Gen AI) in higher education (Majeed, et al.2024). Though extant research highlights the prospects of Gen AI to enhance the teaching and learning effectiveness, thus, promoting more interaction and engagement in classes. H owever, serious concerns regarding the ethical use of Gen AI to safeguard students' cognitive, creative, and analytical abilities have also been raised (Majeed, et al.2024).

Admittedly, AI has revolutionized the research domain tremendously. Data analysis, pattern recognition using machine learning algorithms to identify complex patterns with new discoveries have been fostered with the help of AI (Gonzalez & Hernández, 2024). Similarly, AI automates repetitive research tasks enabling researchers to concentrate more on creative and strategic sides of their work (Gonzalez & Hernández, 2024). However, some ethical concerns such as data privacy, academic integrity, and algorithmic bias have been raised at the integration of AI in education and research (Choi, et al.2025; Alali & Wardat, 2024). The ethical and pedagogical challenges regarding the use of AI tools in research and teaching in Pakistan necessitate to explain the phenomena using the theoretical lens of the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, et al.2003), Technology Acceptance Model (TAM) (Davis, 1989) and constructivism and connectivism learning theories (Siemens, 2005). The perceived usefulness (PU) and perceived ease of use (PEOU) are the key drivers ensuring users' technology acceptance (Davis, 1989). The use of AI tools like chatGPT, Grammarly etc. facilitates the researchers and students to streamline the academic writing, thus reducing workload. However, mal-information, academic dishonesty and over-reliance are the ethical concerns that demar both perceived usefulness and perceived ease of use (Zawacki-Richter, et al.2019). Notably, the use of AI tools is perceived as a challenge to the integrity of research, where critical reasoning and originality of ideas are primarily fundamental in the domains that demand the elements of subjectivity, contextualization and qualitative reasoning (Selwyn, 2019). The expanded version of TAM is the Unified Theory of Acceptance and Use of Technology (UTAUT) that encompasses four key

drivers: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh, et al.2003). The institutional and infrastructural variability in Pakistan makes this model a better fit to explain that exposure and better digital infrastructure in urban areas may ensure better effort and performance expectancy. While facilitating conditions such as policy support, training and availability of AI tools and social influence can vary significantly even in public and private research centers in urban areas. Therefore, regulatory clarity at the national and institutional level can streamline the adoption of AI tools in research and education. Likewise, interdisciplinary collaboration among various stakeholders like policy makers, and technologists can help address these potential threats to leverage the potential of AI (Mustafa, et al.2024). These stakeholders can come together to agree upon some unanimous ethical frameworks to address the inherited issues of AI adoption in education and research (Rensburg & Westhuizen, 2024).

The use of AI tools in research is believed to enhance students' critical thinking, academic abilities, and self-efficacy (Zia, et al.2024). The flip side of AI prevalence in research posits various challenges in Pakistan. The over reliance on AI tools passively engages the users thus, may hinder their deep learning. The superficial learning and the erosion of critical thinking skills (Luckin, et al.2016) stand against the perspective constructivist learning theory (Piaget, 1972). This theory posits that learning is a constructive process built actively on new ideas extracted from past and present knowledge of the learners (Piaget, 1972). This argument can be counter-explained by the theory of connectivism (Siemens, 2005), that discourages learning in silo, proposing that knowledge can be transferred across networks and learning is the capacity of the learners to navigate and grow these networks. Thus, the use of AI tools facilitates access to diverse knowledge resources.

One major issue emerged is the fact that since various faculty members and researchers are not well adept in the use of AI tools, therefore, they are unable to keep pace with the emerging pedagogies. Here comes the need of faculty development programs to integrate AI responsibly. The need is to resolve some other pressing issues like language barriers and lack of localized content to bridge digital literacy and pedagogical gaps (Qazi, et al. 2020). Similarly, lack of infrastructure and resources poses another challenge to integrate AI optimally into pedagogical and learning processes (Ali, et al.2024), thus resulting in the digital divide, particularly in rural and underserved areas (Khurshid, et al. 2024). With significant investments in AI infrastructure, China and India have extensively adopted and utilized AI in education, unlike Pakistan (Shoukat, 2024). The integration of AI in research demands strategic investment in AI infrastructure and training for researchers to reap the benefits of AI, by enhancing the research capabilities of Pakistani universities. The need is to treat AI strategically as a key industry (Hussain & Rizwan, 2024). Likewise, lack of transparency and fairness can pose the threat to academic integrity (Sain, et al.2024). To ensure the ethical use of AI in higher education, comprehensive policies are indispensable (Sain, et al. 2024). To serve this purpose, AI can play a significant role in evidence-based decision-making in educational policy (Noor , et al. 2025). This can help Pakistan to be a competitive player in the global AI landscape (Hussain & Rizwan, 2024).

A brief stock of literature review posits that ethical concerns raised by the use of AI particularly in research need to investigate qualitatively to get deeper insights from the academicians and students in Pakistan. This study aims to serve this purpose by conducting a two tiers research to triangulate the findings of FGDs with the results of the descriptive analysis.

3. METHODOLOGY

This research uses a mixed-method research strategy in two tiers. The first part is the qualitative focus group discussions and the latter part is a quantitative survey. While designing this research, the focus is that the qualitative results should be triangulated by descriptive quantitative findings (Creswell & Clark, 2017). For this study, two Focus Group Discussions and a quantitative survey have been conducted. This sample size of two focus groups follows the established research practices in qualitative studies (Guest *, et al.2017*). Research posits that two to three focus groups normally capture 80%–90% of the main themes and ideas for the phenomenon in qualitative research (Guest*, et al.*2017). Though more focus groups ensure an extrapolation to the wider population. However, two focus groups can be adequate for identifying major patterns and themes, especially time and resource are constraints.

The findings from both approaches have been integrated at the discussion level through a weaving approach of narrative technique (Creswell & Clark, 2017). The integration technique improves the transparency of the research design via triangulation and helps in drawing conclusions and inferences. Thus, this integration has rendered the comparison of findings from two strands more clear and comprehensive (Creswell & Clark, 2017; Fetters, et al.2013). The sample for both tiers of research are faculty and researchers and the students at research level.

Table 1.
Profiles of FGD 1 Participants

Respondents (Pseudo names)	Gender	Academic status	Designation	Area
Dr. AK	Male	Faculty	Asst. Professor	Computer Sciences
SI	Female	Faculty	Lecturer	Computer Sciences
NK	Female	Faculty	Lecturer	Management Sciences
DA	Male	Faculty	Lecturer	Management Sciences
AR	Female	Student	-	Public Policy

For this research paper, two Focus Group Discussions (FGDs) have been conducted, using semi structured interviews. Since a well-structured and moderated FGDs can not only better explain individuals' feelings and opinions about the phenomenon under observation (Kreuger & Casey, 2000) but also can widen the scope of understanding of the respondents' insights to validate the research (Gill, et al.2008). Thus, these FGDs have facilitated in mining meanings out of communicated opinions and statements. The interaction of respondents during FGDs have helped generate the interactive data (Lederman, 1990). The number of respondents in FDGs has been 4-12 as per scholarly recommendation by Brown (1999). FGDs were analyzed through thematic analysis techniques (Clarke & Braun, 2017). The following tables (Table 1 & 2) mention the profiles of the participants of the two Focus Group discussions, FDG1 and FGD2.

Table 2.
Profiles of FGD 2 Participants

Respondents (Pseudo names)	Gender	Academic status	Designation	Area
KS	Male	Faculty	Professor	Management Science
SA	Female	Researcher	-	Supply Chain
AS	Male	Student	-	Public Policy
HH	Female	Faculty	Asst. Professor	Economics
GS	Male	Researcher	-	Development Sector
EH	Male	Faculty	Asst. Professor	Econometrics

Afterwards, a survey has been developed based on the themes emerged from FGDs that focused on triangulating the findings of the FGDS. A descriptive analysis approach has been used for the survey.

4. ANALYSIS AND RESULTS

4.1 Thematic Analysis

For this research, FGDs have been analyzed using thematic analysis (Clarke & Braun, 2017), which can be considered as a continuum of analysis (Krueger, 1994). Since thematic analysis is an iterative process, it helps themes to develop both from the research questions and from the narratives of participants. It records, identifies and reports themes (patterns) from the data and interprets data from various aspects (Boyatzis, 1998).

AI and its increasing use are getting pivotal in the education and research domain, and people in academia and research are extensively using it. The generative AI tools are helpful and supportive in reaching the message to larger audiences, but the negative aspects of it cannot be denied as well. For the purpose, two focus groups were done and the following themes largely emerged from them.

4.1.1 Perception of AI

One important aspect of the focus group was to understand the perception regarding the existence of AI. According to the responses, all of the participants mentioned that AI tools are a major part of the current technological setup and have an integration in all aspects of life. Whether they like it or not, they cannot deny the importance and other aspects of AI. A respondent mentioned, *"Even my son, who is 11, uses AI in a social platform to have conversations he can't with me or his mom".* Another respondent mentioned, *"AI is now everywhere, wherever machine-human interaction is possible".* Most of the participants in both the groups agreed with the statement that it is inevitable, that you don't come across AI, and respondent AK exclaimed that "*Oh, the auto email suggestions and reminders for attachments is also AI, so you agree or not, you're using it and taking advantage of it".* Respondent NK added to it *"AI is a powerful tool and it is improving its efficiency over time, we all come across it".* Therefore, a common perception around AI is that it is here to stay and one cannot deny the technology and live without it; the sooner people realize and adopt it, the better it is in the long run.

4.1.2. Use of AI in education and research

Another focus area of the research and a major theme that emerged is the usage of AI tools and generative AI in the education and research field. Since the group included senior researchers, teachers, and students so the response was from a diverse group, and unanimously, all respondents agreed that AI is now a part of the education and research field. The students responded that they use it for their assignments and quick preparation for examinations. Respondent AS mentioned, *"Sometimes to understand quickly and easily I refer to Chat Gpt, it simplifies the concept for me until I understand and also, Generative AI on Google search page makes things easy for me*". The student in other group highlighted that *"we students can use AI for very limited things, just making assignments, getting things done, etc. But if teachers or school administration use this same thing, they can use it for very different things"*

Respondent SI remarked that "I agree with Respondent AR, *AI is a powerful tool and it has helped me in planning lessons quicker and practical and handling class activities innovatively, so I believe it is a thought partner for me"*. Further, Respondent NK added *"It is a powerful too, but we need to make sure that we use it for our and our student's advantage and not over-rely on it."* The respondents from both groups agreed that AI's embedment in the education and research field is fruitful and timely, as it saves people's time and improves workflow. The respondents mentioned that using AI as an assistant is important, and teachers and researchers need to learn AI tools to expedite their usefulness, and only then can they identify and prevent its negative usage. Respondent EH said *"If Generative AI is writing statistical codes for me and I am checking if they're right before incorporating them, it is helping me do my other analytical and interpretive tasks quickly, which require my mental effort rather than spending a lot of time on writing codes".* Therefore, it can be observed through the respondents that AI technology has ability to work as an assistant and it depends on our understanding that how we have to use it that it supports us and does not over rely on it, which can impact our critical thinking.

4.1.3. AI and critical thinking

Since critical thinking is imperative for human kind, it differentiates a human from all other living species therefore, we need to enhance it rather than impairing it, which in certain cases AI is doing. One of the purposes of higher education is to equip students with the ability to think critically and out of the box. Similarly, the focus group discussions largely agreed that in a way of other the critical thinking has been effected across board. Though the participants have highlighted that it depends on how we use it, respondent NK expressed "*Well, it gives us answers based on our prompts, but we basically lost touch with the actual core of the idea of our prompts and start relying on the surface learning, which is basically the threat to critical thinking which should come from authentic in depth resources not surface level data"*. Respondent of FDG2, HH made a similar point " *AI tools often give wrong interpretations, that look superficial, we do require critical thinking to humanize the interpretations, blindly following AI will impact it not the proper usage of tool".* Respondent GS added that *"AI can support humans in harnessing their abilities to think critically and attain next level of intelligence given we use AI objectively".* Conclusively, the consensus around the idea was that AI has impacted our ability to think, which has also been impacted by other technologies as well. And if this dearth of critical thinking leads to more AI-assisted cheating, it will have a negative impact on the education sector and will compromise many research ethics.

4.1.4. Ethical debate around AI and training

An important aspect of using AI tools for education and research purposed sometimes impacts the sanctity of the purpose. Therefore, carelessly using AI is considered AI-assisted cheating, specifically with the refinement of Generative AI. The theme of ethics was also a highlight in focus group discussions. Respondent KS pointed, *"Thoughtlessly using AI will bring no good and will create larger ethical problems for both researchers and students in the future when AI will be everywhere, I believe most researchers are familiar with the ethics, it's upon us how to inform students about it".* Based on the idea of assisted cheating and mindless overreliance on AI tools, ethical concerns are raised from all the participants of the discussions. The major ethical concerns were raised and have been part of literature regarding the student plagiarizing and unethically using AI. Most respondents proposed a change in assessments and pedagogy, which could discourage purposeless usage of AI and improve ethical and critical learning. The growing focus on the idea of proper training and setting an acceptable range of Generative AI was enlightening. Respondents consider adequate use of AI as a proper soft skill and believe it to be a probable job requirement as well, which is why right-oriented training on the use of AI and AI tools is the need of the hour.

4.1.5. AI regulations

A recent tech guru suggested the regulations for AI, which is a very timely demand. Given the talks about mental impact and ethical concerns regarding AI, regulations are inescapable. Similarly, regulations were a significant debate point in both discussions. Repondent SI argued *"AI is an active partner, not as something that we should ban. A lot of the debate at the moment is about should we use it? Shouldn't we use it? So there shouldn't be this binary there, It is an integral part of our work now and will be strengthened even more".* Most of the respondents approved the idea of regulations to enhance the usability of AI in academia. Participants mentioned the introduction of regulatory frameworks and guidelines at few institutions. However, on the other hand, few participants shunned the concept of regulations, they just believe in the fair usage of AI to the best of its ability. Regulations and over regulations are different things. Probably the people against regulations have a fear of over-regulations and banning of the usage as happen to most technologies in the third world countries. But for the better use of the AI technology and the sanctity of research and education needs to be the top priority with appropriate regulations.

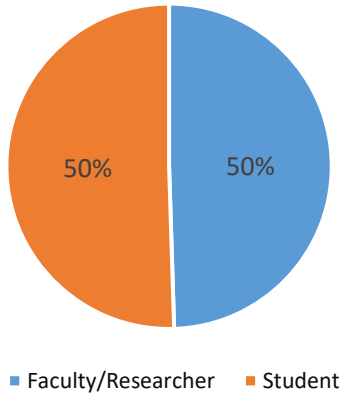
4.2. Descriptive Analysis

For this study, the survey forms have been emailed to the potential respondents with google form.

Besides, the use of Google Forms for data collection has the limitation of lower response rate like 13% as per established research (Scot, et al.2011). The sample has been selected randomly. We have received 100 completely filled forms. Though this sample number may deem small, however, for descriptive analysis the small size still serves the purpose to offer valuable insights (Cohen, 1988). Extant research supports that for exploratory or preliminary studies when the where the focus is to grasp a general understanding of the phenomenon under examination, a small sample is acceptable (Fowler, 2014).

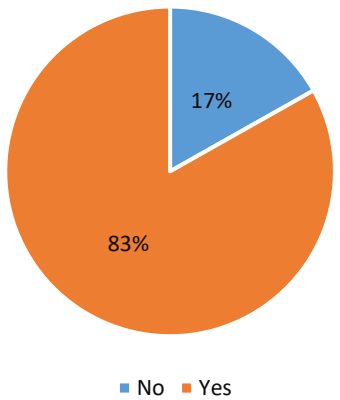
To validate the findings of the focus group discussion, we conducted a small survey of a total of 100 students and faculty, and the results are shown below.

Chart 1: Status of Respondents



The results shown in **Chart** 1 reveal that the number of respondents were equally spread between faculty/ researchers and students. We haven't distributed the data in these two categories for the general validation of the focus groups. **Chart** 2 shows that 17% of the survey population doesn't use AI tools, whereas the remaining population, consisting of researchers and students, uses AI tools. The data also revealed that 10 out of 50 faculty members don't use AI tools, and students have mentioned that they do not use AI tools.

Chart 2: Do you use AI?



The data in Table 3 reveal that 46% people have started using AI tools in the last 6 months' time frame whereas 17.8% respondents have been using AI tools for around over and above 3 years. The results in Table 2 show that the 46% respondents reveal that AI has been very or somewhat effective, while 93% respondents agree that AI has improved the efficiency of their work. These respondents are well aware of the use of AI tools and have learned to make it assist them in a meaningful way.

Table 3.
Use of AI & its Perception

Questions	Responses	Count
AI Use	3 or more years	17%--15
	1-3 years	24
	6 months-1 year	6
	Less than 6 Months	46%
AI improves Effectiveness	Very Ineffective	1%
	Somewhat effective	45%
	Very effective	50%
	Neutral	3.5%
Efficiency	Significantly improved	54%
	Somewhat improved	39%
	No change	3%
	Somewhat decrease efficiency	3%
	Significantly decrease efficiency	1%
Number of Respondents: 84		

When the respondents have been inquired what are the reasons to use AI tools, they have responded that AI helps them in their research work. 29% respondents have mentioned that AI has helped them in a way or other in the literature review of their research. 22% respondents have mentioned the use AI tools to help them in data analysis. Other responses show that the respondents of this survey are well aware of the use of AI and use the tool to enhance their efficiency and save time by finding relevant literature and getting analysis done through AI tools.

Table 4.
Reasons of Using AI & Challenges to Use AI Tools

Reasons of using AI	Count	Challenges of AI Tools	Count
Data Analysis	22%	Difficulty in learning to use tools	9.94%
Predictive Modeling	9.4%	Limited scalability	8.8%
NLP	7.2%	Difficulty in interpreting AI generated results	8.2%
Computer Vision Tasks	5%	Ehical concerns with AI use	19.3%
Automating Repetitive Tasks	10%	High computational costs	6.62%
Statistical Modeling	11%	Poor quality or accuracy of results	12.7%
Literature Review & Research Assistance	29%	Lack of integration with other tools or datasets	17.7%
Others	6.1%	Limited technical support or documentation	13.8%
		Others	2.7%

When asked about the challenges the respondents face while using AI, they have highlighted many challenges. The largest number of respondents (19.3%) have mentioned that they have an ethical concern regarding the use of AI. While 17.7% respondents have identified a lack of integration of data with other datasets and tools. Some 13.8% respondents have shown their concerns for limited technical support and documentation for the use of AI Tools. The respondents (12.7%) have also raised concerns regarding poor quality or accuracy of results (Table 4).

Table 5.
AI & Ethical Concerns

Familiarity with Ethical Principles of Using AI Tools	
Very familiar	33%
Somewhat familiar	47%
Not familiar at all	3%
Heard but not very familiar	17%
AI usage Ethical guidelines should be enforced	85%
Ethical AI trainings & workshops to conduct	95%
Encountered ethical concerns regarding AI tools	45%
AI taking more research fields in future	80%

Besides, when respondents have been asked regarding the ethical principles of using AI tools, 80% mentioned they are familiar that using AI tools may have ethical concerns. 85% of respondents are very much in favor of proper implementation of ethical guidelines. 95% respondents would expect to attend trainings regarding the ethical concern of AI use (Table 5). This may be the reason that academics think that AI is here to stay and they want to be ethical in their use of their AI assistant. Therefore, about 80% the respondents believe that AI is here to stay and will take over most of the research fields (Table 5) in the coming years.

Table 6.
AI & Critical Thinking

AI usage impacts Critical Thinking	
For better	41%
For worse	31%
AI usage impacts Critical Thinking (Researchers' Perspective)	
For better	88%
For worse	12%
AI usage impacts Critical Thinking (Students' Perspective)	
For better	20%
For worse	80%
Over-reliance on AI Use	
May lead to overlooking important aspects of Critical Thinking	57%
Enhances the ability to focus more on important aspects	35%
Evaluation of AI content before incorporating	
Always	51%
Never	3.5%

Further to identify the impact, according to Table 6, the respondents think that AI has both positive and negative impacts on their critical thinking, which has also been a significant concern emerged in the focus groups. 88% respondents have mentioned that AI tools have impacted their critical thinking skills in a better way. The number of respondents who believe that AI has strengthen their critical thinking skills are faculty or researchers. 80% student think that their critical thinking has been impacted negatively, while 20% think AI use has affected critical thinking in negative way. This may be the reason that the students are meaninglessly using AI and doing AI assisted cheating which is impacting their problem-solving and critical thinking skills because they cannot

properly think out of the box without the use of AI. When the respondents have been questioned if they check the results produced by AI before incorporating in their work, 51% respondents have mentioned they always check the AI-related solutions before incorporating those in their work. Further, when inquired about if over-reliance on AI has led to any negative impact on the research activities 57% respondents have mentioned that whenever they have relied more on the AI tool, they have overlooked the important aspects of research whereas 35% respondents have said, they have found that their research performance has improved.

Table 7.

AI Regulations

Should AI be regulated?	94.2%
Support for strict regulations	71.4%
Global	67.8%
Local	23%
Responsible for AI regulations	
International organizations	11.9%
Industry bodies	15.4%
Independent ethical committees	16.6%
Education Ministries & Boards	10%
Academic institutions & Research organizations	45%-

Since, regulations on AI and AI tools is one of the focus area of the study, therefore it was also questioned in the survey. According to the survey result, 94.2% respondents have agreed that there should be regulations on the usage of AI and its tools. Whereas 71.4% believe that the regulations should be strict to enhance the research. Likewise, 67.5% respondents have suggested that regulations should be global. The idea focuses on the standard regulations around the globe, as third-world countries usually suffer due to technological regulations that do not meet global standards. About 45% respondents have mentioned that academic and research organizations should set the regulations for the AI usage as most of the research is conducted in the educational and research institutions. Therefore, they should decide for the AI regulations.

5. DISCUSSION AND CONCLUSION

The aim of the research was to identify whether the AI is currently integrated into the education system and if there is any threat to the ethical inviolability of the research in Pakistan. Further, the research focused on exploring the regulatory aspects of AI in research and academia in Pakistan. The research findings have revealed that in academia, people are mostly well aware of the usage of AI and are integrating it well in their studies, the focus groups have mentioned their usage of AI tools for the improvement of their work and the findings of survey shown in Chart 3 has have also shown that almost half of the survey population has been using it over 6 months, and the other half has started using it in the last six month's timeframe which is a clear indicator of that people are getting aware regarding the use of Generative AI tools and are using it to increase their efficiency and effectiveness. These findings are well in line with the extant literature that AI tools are well integrated in the education system, but maybe are a threat to the ethical and critical skills of the researchers (Majeed, et al.2024).

Therefore, the study also explored the impact of the usage of AI tools on critical thinking and ethical usage. The study revealed fascinating facts: Most of this study's participants who use AI tools consider that ethics are only compromised, and critical thinking is impacted when AI tools are used in a simplistic and careless manner. The study results have shown that critical thinking may be impacted due to overreliance on the AI tools, but it has also opened the way to unexplored ways of thinking and cognition. There is a general consensus that AI will learn more over time and become more efficient, and take over many academic and research fields with its powerful learning techniques. Therefore, the participants' primary focus was on the effectiveness of AI tools and how they are supportive tools and should be used as thought partners or assistants rather than as a threat, which corroborates the findings of Hussain and Rizwan (2024).

Finally, the research focused on determining the mindset towards regulating AI tools as García-L´opez suggested (2025). The results have shown that many of the participants are in favor of regulations that will ensure the ethical sanctity of research and education but, don't advocate strict regulations. Participants believe that the institutions should come up with the regulatory frameworks for their organizations to ensure high standards and ethical researchers without compromising on the ability to use the powers of generative AI which does the hefty work of finding the correct information to be used in their research and save time in repetitive tasks and allow them to use their energies at improving the efficiency and impact of their research. Further, a few participants believed that even simpler regulations would also impact the usage and would raise moral and ethical concerns, despite the ethical use of the tools.

The research on AI is currently under exploration and is a pivotal topic around the globe. This research aimed to identify the mindset regarding AI in Pakistan at the research level. This research leaves room for in-depth exploration of these ideas on a larger scale in the future, and can use RCT techniques to find the impact of the usage of the tools since this research is done at a smaller scale/

Conclusively, this research has busted the myth that generative AI has only been used as a shortcut and as a cheating tool; instead, it can work as a strong research assistant that can work quicker than any human. The onus of using the correct information lies with the user of the generative tool, how well-versed they are with the technique, and whether they remain fair with the usage of the AI tools. It is imperative that there should be training regarding the usage of AI tools to assist in the smart work, which is time-saving, efficient, and produces high-quality research. Further, the regulations are required everywhere for ethical usage of any resource, but there is a need for a country like Pakistan not to overdo the regulations, which can impact the productivity of the tool. The paper discovered that AI can have any impact on academia i.e. positive or negative, it just depends on the usage of the generative tool and the intentions of the user.

5.1. Ethical and Pedagogical Synthesis in the Pakistani Context

The ethical and pedagogical implications of AI in higher education in Pakistan cannot be fully understood without situating them within a broader socio-technological context. Pakistan lacks a comprehensive national policy on AI in education, and institutional adoption is often fragmented and ad hoc. This creates uncertainty for both faculty and students regarding appropriate and inappropriate uses of AI tools in academic work. Without clear ethical guidelines, universities risk fostering a culture of instrumentalization of AI—using it merely as a shortcut rather than a tool to enhance learning and research. Moreover, ethical issues intersect with pedagogical equity. For

example, elite institutions may integrate AI through curated learning management systems and AI-enabled libraries, while underfunded public universities struggle with basic access to internet and computing resources. As such, discussions of AI in pedagogy must also address digital inclusion, capacity building, and contextual relevance of AI tools for local research agendas.

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