

## **Usage and Implications of Artificial Intelligence for Research Purposes at University Level**

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### **Abstract:**

AI is a complex form of research that aims to enable machines to act, behave and make decisions like humans. As advances in computing and Information Communication Technologies (ICT) continue, there is a gradual shift towards designing and designing computer systems and devices with human-like dimensions and functionality that make them more impactful in. The method chosen for this study is quantitative research. The area where new technologies were using AI tools was those using learning analytics. The method of data collection was a survey questionnaire based on Google as a method of data collection based on closed questions. The design of the questionnaire followed several assumptions such as linear, multiple questions, etc. The method used for data analysis included descriptive statistical analysis, correlation, and regression analysis. Furthermore, statistical evidence has shown that AI tools can be widely used for research purposes. This study offers suggestions to university students that they can use AI tools effectively in their studies in universities, either by increasing their awareness and trying to adopt AI technologies or ensuring that they carry technological tools a large face will dominate the role. University IT departments should collaborate with students to set up AI labs and strengthen virtual labs.

**Keywords:** Artificial Intelligence, University level, ICT, and college students.

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### **Introduction:**

Artificial intelligence (hereafter AI) is the ability of technology that means particularly computer systems has features like human intelligence processes at breakneck speed. These AI applications, including expert systems, natural language processing, speech recognition, and machine vision, provide illustrations of the capabilities in this field.

The term 'AI' changed into first delivered in 1955 with the aid of J McCarthy as he prepared a research proposal for the Dartmouth Summer Research Conference (McCarthy et al., 1955). However, because then, there has been no extensively agreed-upon definition specially concerning the utility of Deep Learning. In a wide sense, AI can be understood or have a ability to put human intelligence into machines. Tredinnick (2017) describes AI as a set of technologies and computational methodologies that emphasize the capability of computers to make adaptable and rational decisions when faced with unsure and ever-converting environmental circumstances. According to Jakhar and Kaur (2020), AI relates to a domain within computer science that focuses

on growing structures able to appear duties typically associated with human intelligence. Berendt (2019) adds that the primary result of AI is know-how, which can be treasured and comprehensible to both people and machines.

Basically, AI has been the way to transform the method of human features into robotics, allowing students to increase their knowledge faster. Students have the edge now as AI algorithms have power to solve any query in under a minute. Machine learning (the ability of a machine to replicate human intelligence) in this field of artificial intelligence machines oversee finishing daily jobs and are thought to be smarter than humans. So, students are solving their problems for exams, assignments, research, and all other information that could help in student development. This study intends to have a look at the use of AI equipment for research purposes within the local context of educational surroundings of Pakistan. The purpose of this study is to research the connection between the use of AI equipment for studies motive among the University college students.

**Objectives of the Study:**

1. To determine whether gear of AI can be used for research among university college students.
2. To decide whether gear of AI stand correlated with use of research amongst University College students.

**Literature Review:**

In recent times, the indispensable nature of artificial intelligence within computer science has become widely accepted as the field's importance continues to grow. Students, without basic knowledge, find it very difficult to track the material when first interacting with rigorous artificial intelligence algorithms. Many researchers besides educators talk about simulation systems with software tools to represent an algorithm as its dynamic behavior to find a working solution. As a result, new technologies have led to an increase in learning as well as teaching (Stamenkovic et al., 2023).

"Python for Data Analysis" by Wes McKinney provides a standard Python programming language relevant to AI research, focusing on using Python for the purpose of data analysis, which is crucially needed for AI applications. The guidance and wide range of real-world examples offered alongside libraries like NumPy, Pandas, and Matplotlib within the tool can further aid users in exploring and manipulating data in diverse ways.

Research utilized AI as an advanced computer algorithm that intelligently analyzes and extracts valuable features from extensive healthcare data. These insights are then applied to enhance

clinical practice (Abid et al., 2019). In Pakistan, AI has been experiencing development since 2018, primarily through the President's initiative on Artificial Intelligence and Computing. The study represents the first survey conducted to assess the readiness and attitude of medical students towards AI in the context of healthcare sector. In this look at, the researchers collect their consequences from 384 clinical college students in colleges located in Khyber Pakhtunkhwa, particularly in Peshawar. The researchers hired a non-chance handy sampling technique to choose the participants for their examination (Abid et al., 2019). The goal turned into to analyze the mind-set of medical students toward the integration of AI in undergraduate scientific training. Out of the 400 students first approached, a total of 384 college students completed the survey. Based on their findings, the researchers concluded that scientific training must be revised to align with the requirements of the virtual era, emphasizing the incorporation of AI standards into undergraduate medical education (Abid et al., 2019).

In this literature, the number one justification for a new device became to perceive the want for gadget re-engineering. The researchers aimed to analyze and examine the factors or factors that make contributions to the requirement for re-engineering. By conducting their research, they meant to decide the unique aspects that imply the necessity of re-engineering a present system. Analyzing: The researchers on this take a look at performed implementation paintings and tested the environment, equipment, and technologies associated with a present system. They centered on monitoring the requirements analysis system and assessing the feasibility of diverse features, figuring out which components had been possible, and which have been not for the duration of the design of recent systems. This assessment allowed them to make knowledgeable decisions concerning the inclusion or exclusion of specific functions inside the newly designed structures. Redesigning: After studying the gaps and necessities, they evaluate the current gadget architecture and try to examine the charges, time necessities, and each person's thing. Evaluation: In the look at, the researchers performed trying out of the newly re-engineered device based on user requirements. They performed testing with real-time requirements and considered the demands and preferences of the users. If the users expressed a need for any modifications or amendments, the researchers incorporated changes in the system based on the users' priorities. This iterative process allowed for continuous improvement and alignment with user expectations. In the light of user demand, a newer system was finalized to be implemented with renewed features.

Literature provides evidence to guide the idea that AI systems and equipment have the capability to facilitate the transport of precision medicine. These structures can operate with multiplied pace,

effectiveness, and accuracy, corresponding to human clinicians. Additionally, does the implementation of AI technology have the potential to enhance the overall healthcare shipping process of medicine?

Currently, clinical colleges face a shortage of college individuals with the necessary understanding to efficaciously teach AI in medicine content material. However, it's miles predicted that as technology continues to enhance, the function of AI in scientific training will enlarge. This growth will create new possibilities for scientific college students and docs, requiring competency in using AI. As a result, destiny medical experts will probably have new roles and duties that leverage AI technology in healthcare settings.

This paper includes an overview of AI in education (AIEd), analyzing grants, conferences, journals, and software tools, aiming to guide educators and scholars in understanding its development. By identifying active researchers and institutions, it assists in recognizing key contributors to AIEd research. Moreover, it highlights essential journals and major issues within AIEd studies, emphasizing the launch of Elsevier's new journal, *Computers & Education: Artificial Intelligence*, underlining its significance in this evolving field.

“Russell & Norvig (2005) “AI a modern approach” by Stuart Russell and Peter Norvig highly acknowledged textbook offers an introduction of AI, focusses on themes like search algorithms, knowledge representation, machine learning, and natural language processing. It provides a key source of understanding AI concepts and techniques. Chatbots have been created specifically to address predictable inquiries, such as providing directions or other types of commonly asked questions. In the context of library services, chatbots hold significant potential in efficiently assisting users with reference queries and reference services (Mckie & Narayan, 2019).

While artificial intelligence, robotics, and automation are anticipated to present various complications for higher education to confront, addressing such difficulties will require innovative solutions from the domain of advanced learning. Primarily, these technologies are progressively replacing jobs and will continue to do so, leading to significant transformations in national economies and disrupting global economic development (Ma & Siau, 2018). According to Tredinnick (2017), the impact on jobs will not only stem from direct replacement but could also potentially undermine the traditional sense of occupational identity.

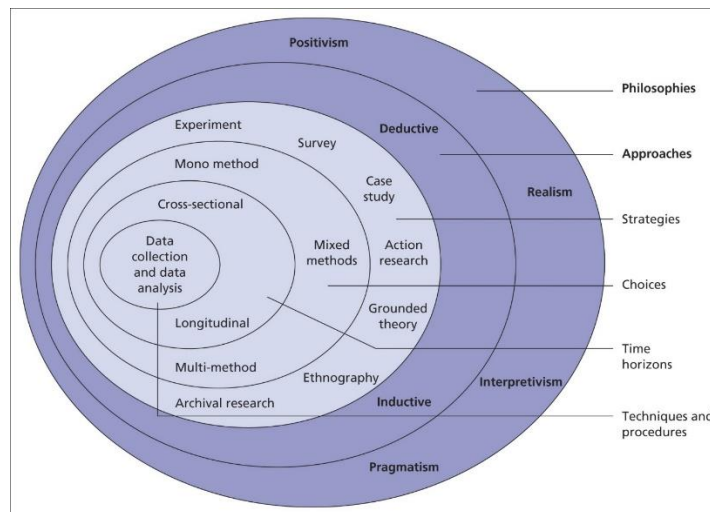
This paper includes AI applications in Pakistani academic libraries through qualitative interviews with 10 chief librarians. It highlights existing AI awareness, particularly in Natural Language Processing (NLP) and text mining for library services. While cloud-based services are accessed

for big data, awareness of robotics and chat bots remains less. The study offers insights and suggests collaborations between library schools and computer science departments to establish AI Labs in Libraries. Challenges of funding and technological skills are identified as key barriers to AI implementation in university libraries.

Topic: Usage of Chat GPT for Students In medical education, research, and clinical management, ChatGPT can be a useful tool. However, because it still suffers from the same problems that AI does, it cannot be viewed as a replacement for human talent and learning skills. because in AI these things have to do better such as (information technology, machine learning) than AI can put an impact At this rate, it won't take long for it to change the way we approach clinical management and medical education (Firat, 2023).

"Python for Data Analysis" by Wes McKinney provides a standard programming Python language regarding AI research, focus is on utilizing Python for the purpose of data analysis, crucially required for AI applications. It offers libraries like NumPy, Pandas, and Matplotlib, offering a wide-ranging real-world example along with guidance to further explore and manipulate data.

**Data Collection and Methods:**



**Research Philosophy:**

Research philosophy is taken into consideration as vital component in the research process as it allows the researchers to figure out the series of complete study. There are 3 branches of research philosophy. Their types are epistemology, ontology, axiology (Maarouf, 2019). These major branches in addition categorized into sub-branches which facilitate the research in selection of suitable sequential manner for observe in line with the studies onion (Eriksson et al., 2015).

**Research Approach:**

Advanced literature within the area of social technology indicates that there are processes of studies: inductive and deductive research approach (Woiceshyn et al., 2018). The inductive technique starts off evolved from the phenomena under commentary to the idea building at the same time as deductive research approach is for the theory testing and extension (Zalaghi et al., 2016). The gift study taken into consideration the two underlying theories in modern-day look at for this reason, the present take a look at is following the deductive research method.

**Research Strategy:**

According to the research onion research strategy facilitates the researchers in defining the process of data collection (Saunders et al., 2009). The present study intents to collect data from the secondary sources i.e., published audited annual reports, Pakistan stock exchange portal, and company website. Hence, considering the above discussion the present study will collect the data from the secondary sources.

**Research Choices:**

Research choices involve deciding on techniques, assets, and procedures to investigate a topic. It's like identifying which paths to explore in a big, wooded area of knowledge, thinking about special equipment and approaches to gather records. It's a piece like picking components for a recipe every choice can have an impact on the results and intensity of knowledge. Ultimately, it is about making considerate decisions to discover new insights and amplify our knowledge of the world.

**Time Horizon:**

There are all sorts of studies time series and go-sectional. Time collection research considered the statistics for the particularly latent assembled over the long period of time. The move-segment studies take into consideration the statistics approximately the latent constructs for the unique period. The time horizon facilitates the researcher in outlining the timeline for information series.

**Techniques and Procedures:**

The approach selected for this study is quantitative research. The method of data collection was Google based survey questionnaire as a tool to gather data based on closed-ended questions. The design of the questionnaire followed a number of scales such as Linear, multiple questions, etc. Units of analysis were the students of ADP CS program of University of Management & Technology, Lahore.

**Data Analysis and Discussion:****Descriptive Statistics:**

The descriptive statistics indicate that 59.7% respondents were male, and 40.3% respondents were female out of 201 participants data collected using research survey (see appendix 1). The findings of current study data collected using survey indicate that 44.8% respondents indicate their level of education is under graduation, 40.8% respondents indicate their level of education is graduation while 14.4% of total respondents indicate their level of education is post-graduate (see appendix 2).

**Role of AI in Research:**

To the above question, a large segment to the extent of 55.2% answered in agree and 35.8% answered in strongly agree, 6% answered in neutral and 5% were strongly disagree and 1% is strongly disagreed to say that artificial intelligence can improve the accuracy and reliability of research results (See figure 1 appendix 3)

In total 13 respondents indicated that they used the artificial intelligence as tool, but they did not feel any improvement in research outputs while 14 respondents indicate they did not use the artificial intelligence tool and did not see any improvement in research outputs. On the other hand, 6 respondents indicated that they did not use artificial intelligence as tool, but they have witnessed improvements in research outputs. In addition to that 169 respondents indicated that they have used artificial intelligence as tool and witnessed significant improvements in research outputs reported in table 2.

**Chi square tests:**

To test the association between usage of Ai with Accuracy and improvement in research outputs Pearson chi- square tests shown in table 3. The following hypothesis tested the association between Ai usage and improvement and accuracy in research.

**Hypothesis 1:** There exists an association between Ai usage and accuracy in education.

**Hypothesis 2:** there exists an association between Ai usage and improvement in research.

**Table 1: Role of AI in research outputs**

<b>Have you ever used artificial intelligence tools* artificial intelligence can improve the accuracy Crosstabulation</b>							
Count							
		artificial intelligence can improve the accuracy					Total
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
have you ever used artificial intelligence tools	No	3	9	6	2	0	20
	Yes	69	103	6	3	1	182
Total		72	112	12	5	1	202

**Table 2: Role of AI in research outputs**

		Have you noticed any improvements in your research output?		Total
		No	Yes	
Have you ever used artificial intelligence tools	No	14	6	20
	Yes	13	169	182

**Role of AI in data analysis:**

To the above question, a large segment to the extent of 47.3% answered as agree and 39.8% answered in strongly agree and 10.4% answered in neutral and 5% answered is disagreed to say that artificial intelligence can help to analyze and synthesize large volume of data (see appendix 3). To the above question, a large segment to the extent of 45.8% answered in agree and 43.8% answered in strongly agree, 9.5% answered in neutral while 1% were disagreed to say that artificial intelligence will become an essential tool for future research projects (see Appendix 3 figure 4). To the above question, a large segment to the extent of 48.8% answered in agree and 34.3% answered in strongly agree and 11.4% answered in neutral and 5% answered disagree to say that artificial intelligence can help to generate new research ideas (see Appendix 3 figure5). To the above question, a large segment to the extent of 51.2% answered in agree and 25.4% answered in strongly agree and 19.9% answered in neutral while 3% were disagreed to say that artificial intelligence in research should be subject to ethical considerations (see Appendix 3 figure 6).



To the above question, a large segment to the extent of 28.9% were Agree and 22.9% were disagree; however, 13.9% answered in strongly disagree, however 10.4% answered in strongly agree and 23.9% answered in neutral. The majority does not believe that artificial intelligence cannot replace (Appendix 3 figure 7). To the above question, a large segment to the extent of 61.2% were Agree and 27.9% were strongly agree; however, 2% answered in disagree and 9% answered in neutral. The majority does not believe that artificial intelligence can replace human researchers (see Appendix 3 Figure 8).

To the above question, a large segment, to the extent of 90% answered yes and 10% answered no. This indicates that artificial intelligence was used for research projects (see Appendix Figure9).

To the above question, a large segment, to the extent of 88.6% answered yes and 13.4% answered no. This indicates that artificial intelligence is used to improve research outputs (see Appendix 3 figure 10).

To the above question, a large segment, to the extent of 68.2% answered yes and 31.8% answered no. This indicates that users are aware of artificial intelligence limitations (see Appendix 3 figure 11). In response to the above question, 15.4% respondents answered as improving educational research and 15.9% answered in automating, 14.9% answered in personalized way 53.7% answered in all the above. The majority, to the extent of 53.7% favored all of the above that artificial intelligence can help to improve education (see appendix 3 figure 12). To the above question, a large segment to the extent of 81.6% answered in automation and 18.4% answered in computer program. This indicates their understanding of artificial intelligence (see appendix 3 figure 12).

To the above question, a large segment to the extent of 44.8% answered in many and 44.8% answered in few and 10.4% answered in none. This indicates that artificial intelligence has challenges associated tools for research (see appendix 3 figure 13). To the above question, a large segment, to the extent of 34.3% answered in many and 56.2% answered in few and 9.5% answered in none. This indicates that artificial intelligence has risks associated tools for research (see appendix 3 figure 14).

To the above question, a large segment to the extent of 37.8% answered in many and 35.8% answered in few and 26.4% answered in none. This indicates that artificial intelligence has ethical risks (see appendix 3 figure 15). To the above question, a large segment to the extent of 57.2% were Agree and 21.9% were strongly agree; however, 1% answered in disagree, while 3% disagreed and 18.4% answered in neutral. Shows majority agrees that Artificial intelligence can

be standardization of learning (see appendix 3 figure 16). To the above question, a large segment to the extent of 52.7% were Agree and 25.4% were strongly agree; however, 4% answered in disagree, while 1.5% disagreed and 16.4% answered in neutral. Shows majority agrees that Artificial intelligence can help to improve cognitive skills (see appendix 3 figure 17).

**Conclusion:**

Our results predict that a high level of awareness exists among university students about the use of AI tools, however, they understand the use of AI tools for research purposes. Students Knows How to use Ai for research purposes. Students improve the accuracy and reliability of their research. Moreover, it is proved by pi graphs that AI tools can be widely used for research purposes (Objective 1), Besides, use of AI tools has a close relationship with research orientation (Objective 2).

**Recommendations:**

This study offers university students suggestions that they can better utilize AI tools in their studies at universities for research purposes by raising their level of awareness and seeking to adopt AI technologies or looking to implement more advanced technological tools. There should be collaboration among University IT departments and students to tell the use of AI. Labs can strengthen students' weaknesses. However, AI needs challenges like capital financing and users' technological skills to implementing AI at the University campuses. universities tell students usages and how to use AI for better results.

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**APPENDIX 1**

**Questionnaire on**

**Usage And Implications of Artificial Intelligence for Research Purposes at University Level**

**• Section I: Demographics Statistics**

1. Gender specific:
  - I. Male
  - II. Female
2. Ages of respondents
  - I. 21-25 Years
  - II. 26-30 Years
  - III. 31-35 Years
  - IV. 35-40 Years
3. Qualification of respondents
  - I. Under Graduation
  - II. Graduation
  - III. Post Graduate
4. Institute Name

**• Section II Usage and Implications of Artificial Intelligence for Research Purposes at University Level Likert scale**

<b>S. N o.</b>	<b>Questions</b>	<b>1 = Strongly Disagree</b>	<b>2 = Disagree</b>	<b>3 = Neutral</b>	<b>4 = Agree</b>	<b>5 = Stron gly Agree</b>
1.	Do you think artificial intelligence can improve the accuracy and reliability of research results?					
2.	Do you think artificial intelligence can help to analyze and synthesize large volumes of data?				?	

3	Have you noticed any improvements in your research output after using artificial intelligence tools?					
4	Are you aware of any limitations or concerns related to the data that is used for artificial intelligence research?					
5	Do you think that artificial intelligence will become an essential tool for future research projects?					
6	Do you think that artificial intelligence tools can help to generate new research ideas?					
7	Do you believe that the use of artificial intelligence in research should be subject to ethical considerations?					
8	Do you think that artificial intelligence can replace human researchers?					
9	Do you think that artificial intelligence can improve the speed and efficiency of research in various fields?					

**Section III: Use of Tools of artificial intelligence at university level for research purposes using dichotomous scale**

Sr.	Questions	Yes	No
10	Have you ever used artificial intelligence tools to assist with your research projects?		

11	Have you noticed any improvements in your research output after using artificial intelligence tools?		
12	Are you aware of any limitations or concerns related to the data that is used for artificial intelligence research?		
13	How have you used artificial intelligence for your research projects?		

• **Section IV: Tools of artificial intelligence at university level for research purposes**

Sr.	QUESTIONS	Many	Few	None
14.	Are there any challenges that you have faced while using artificial intelligence for research?			
15.	Are there any risks associated with using artificial intelligence tools for research?			

16. How can AI help with improving education?

- Personalized learning experiences
- Automating administrative tasks
- Improving educational research
- All of the above

17. What is your understanding of artificial intelligence (AI)?

- A type of computer program
- A type of advanced automation technology
- Other: \_\_\_\_\_



**APPENDIX 2: CHI SQUARE TESTS**

**Table 3**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.908 <sup>a</sup>	4	.000
Likelihood Ratio	19.506	4	.001
Linear-by-Linear Association	14.842	1	.000
N of Valid Cases	202		

**a. 5 cells (50.0%) have expected count less than 5. The minimum expected count is .10.**

**Table 4: Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1-sided)
Pearson Chi-Square	61.484 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	56.175	1	.000		
Likelihood Ratio	40.791	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	61.179	1	.000		
N of Valid Cases	202				

a. 1 cell (25.0%) have expected count less than 5. The minimum expected count is 2.67.

b. Computed only for a 2x2 table.