The Relationship between General Attitudes and Usage of Artificial Intelligence on Academic Performance of University Students

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Contents

Abstract

This study explores the relationship between university students' attitudes towards artificial intelligence (AI), their use of AI, and its impact on academic performance. The SDG 4 Quality Education is relevant to this investigation. Using a survey intended to evaluate AI attitudes, usage, and academic performance socioeconomic background, the study seeks to comprehend how students' perceptions and use of AI tools impact their academic success while also taking into account the function of FCCU. Information was gathered from 73 Forman Christian College University students. The findings show that students' positive attitudes regarding AI and their academic achievement are positively correlated, indicating that students who accept AI typically perform better. However, there was no apparent association between wealth background and AI adoption, suggesting that AI technologies might become more widely available. This study suggests the integration of AI in formal curriculum in universities, teacher training for AI, and resources and support for students form lower wealth background for use of AI.

Introduction

Artificial Intelligence (AI) has encompassed people in the twenty-first century. AI is being used in practically every industry and is developing quickly (Beig & Qasim, 2023). AI has had a profound effect on people's lives by facilitating easier and more pleasant daily tasks with the assistance of developments in technology. One area where artificial intelligence has the potential to significantly benefit students is through improving academic performance. Education is one of the many fields where artificial intelligence (AI) has been having a significant impact (Yeruva, 2023).

AI has the ability to completely transform education by bringing more individualized, interesting, and effective teaching and learning strategies (Alneyadi et al., 2023). Artificial Intelligence (AI) in education refers to the use of technology like natural language processing and machine learning to enhance the educational process (Alneyadi et al., 2023). These tools allow teachers to tailor instruction to each student's requirements by using algorithms to evaluate data, identify trends, and provide predictions (Khan et al., 2022).

There are several benefits to incorporating AI into schooling. Personalized learning, which enables students to advance at their own speed and in accordance with their individual learning preferences and may result in better academic performance, is one of the biggest advantages (Shrivastava et al., 2023). Furthermore, innovations like chatbots, automated grading systems, and intelligent tutoring systems can increase productivity, lessen the workload for teachers, and provide accurate and consistent feedback. AI may be able to assist students in improving their academic achievement.

Aim of study

The aim of this study is to understand the relationship between the general attitudes and use of AI and academic performance in university students. The questions for this study include: RQ1. What is the general attitude of AI in university students? RQ2. What is the relationship between university students' AI Usage and their Academic performance?

Significance of the study

This study is significant because it is related to SDGs-4 Quality Education. This study will try to identify the role and impact of AI on the academic performance of university students. In addition to it, this study will be finding out the relationship between wealth background and AI usage attitude. Plus, this is going to fill the gap in the existing literature because there are few studies in Pakistan about the new phenomena of use of AI in youth.

Literature review

An experimental study was conducted to investigate the productivity of mid-level professional writing tasks using generative AI chatbots (ChatGPT) (Noy, & Zhang, 2023). A quantitative experiment with 444 college-educated professionals revealed that ChatGPT significantly increases average productivity, reduces time taken to complete tasks, and improves the quality of output. It also reduces worker inequality by balancing productivity distribution and benefiting low-ability workers to produce as much as higher-ability workers. ChatGPT primarily substitutes for worker effort and restructures tasks towards idea-generation and editing, rather than rough-drafting. Exposure to ChatGPT increases job satisfaction and self-efficacy, highlighting the potential benefits of automation technologies (Noy, & Zhang, 2023).

Another study explored the impact of AI on education, focusing on stress management and student productivity (Li, & Jan 2023). A systematic literature review of 15 research articles reveals that AI-powered educational systems can personalize learning, automate administrative processes, and provide intelligent support. These systems can help students cope with rising pressures and workloads, while chatbots and virtual mentors provide emotional support. However, ethical issues like algorithmic prejudice, data privacy, and fair access to AI tools are concerns. Collaboration between researchers, policymakers, and educational institutions is emphasized for a more inclusive learning environment (Li, & Jan 2023).

Another study investigates the use of Quillbot, an artificial intelligence paraphrasing tool, in higher education for English as a foreign language (EFL) student (Mohammad, et al.,2024). A total of 102 students in a Technical Writing course participated in the survey questionnaire and semi-structured interviews. The results showed that QuillBot significantly improved students' ability to summarize ideas, with women answering better. The study also found that classrooms

mediated by technology, personal digital devices, easy access to software and online resources, and appropriate instruction on using the AI tool for syllabus paraphrasing exercises encouraged students to use Quillbot. These factors could enhance students' writing classes, making them more vivid, productive, participatory, and pleasurable. The study recommends EFL teachers use Quillbot to enhance students' paraphrasing abilities and adjust teaching strategies accordingly. The study supports the use of AI in higher education as it enhances students' academic performance (Mohammad, et al.,2024).

A research study investigates the potential benefits of using chatbots as intelligent study assistants to help students succeed in postsecondary education. The research focuses on two studies: one using 215 undergraduate students' interviews with a chatbot named Sammy to understand their perceptions of learning needs and how chatbots can promote student success, and another using a new chatbot named Sammy to evaluate its ability to impart fundamental concepts to 195 upper division business class students. The findings from study 1 showed that chatbots can be used to teach fundamental subjects in a responsive, interactive, and private manner. The findings from study 1 also provided information on students' learning requirements, which was used to create an experimental chatbot assistant to teach 195 pupils in the fundamentals of artificial intelligence. The findings of the follow-up study indicated that chatbots can serve as responsive and interesting conversational learning aid for imparting fundamental knowledge and offering educational materials. This study fills the gap in existing literature by investigating the benefits, drawbacks, effectiveness, and moral issues surrounding the use of chatbots as teaching aids in business schools (Chen, et al., 2023).

According to a research study which explores the role of artificial intelligence in higher education through thematic analysis and secondary qualitative methods, it was revealed that AI

enhances personal and professional skills in institutes and improves students' productivity in learning systems (Priyadarsini Hills, & Kottayam, 2022). This research contributes to existing literature on AI's impact on higher education, as it helps students write better and lead towards better academic performance. The study uses a secondary qualitative method to gather information from important and peer review articles. The findings contribute to the understanding of AI's potential in enhancing academic performance in higher education (Priyadarsini Hills, & Kottayam, 2022).

Theoretical Framework

Everett Rogers, a sociologist, developed the diffusion theory of innovation in 1962 to describe how new ideas, items, or technological advancements gradually permeate communities. It describes how people within a population accept innovations on an individual and social level. Based on this theory, we can derive that new social media platforms like artificial intelligence may have an influence on academic performance (Sahin,2006). However, empirical research is needed to understand whether this relationship and impact on academic performance is positive or negative.

Methodology

Research Design

This study is quantitative in nature and uses a survey to collect data. It is cross-sectional research.

Hypothesis

The hypothesis of this study includes: H1. The better the general attitude towards AI and the higher the use of artificial intelligence, the higher the academic performance (Grájeda,et al, 2024); and H2. Students from higher wealth backgrounds will use more AI and have better academic performance (Méndez-Suárez et al., 2023).

Ethics

This study is a thesis project. This is a quantitative study. Students who participated in this study are given an informed consent letter. Confidentiality is maintained throughout this process. Participants are not forced to take part in this research unless or until they want to be a part of this research.

Sample

Students from FCCU's many departments were selected for this study based on their consent to participate and their interest to take part.

Data Collection

The Institutional Review Board and Ethics Committee of the Sociology department at Forman Christian College University provided initial approval for data collection. Once permission was granted, data was collected through an online Google survey. This collection took place throughout the summer break, while students were at home and away from university.

FCCU students received an email with a Google survey link and a consent form. A Google survey was emailed to university students of FCCU along with a consent form for participation.

Other than that, a Google survey was circulated among students using WhatsApp and Facebook groups. While most of the data was collected from students who were on campus for the summer semester, by emailing them the Google survey. Participants were allowed to withdraw from the study whenever they wanted to, and all willing participants were asked to fill in all the required sections before submitting the form. To maintain the confidentiality and anonymity of the participants nobody has access to the data except the researcher, and all data is stored in a private file.

Survey

Section A of the survey consists of seven socio-demographic questions. Section B consists of 16 questions related to the attitude towards AI, measured on Likert scale [disagree (1), neutral (2) and agree (3)] (Schepman, & Rodway,2020). The higher the scores, the better and more favorable the attitudes towards AI.

Section C consists of 5 questions related to the extent of the Students' AI Usage for Functionality. Questions have been taken from a scale which is developed by Bancoro, 2024 will be used in this study, which includes 5 questions, measured on a Likert scale [very poor (1) very good (5)]. The higher the scores, the better the academic performance.

Section D includes 5 questions on the extent of the Students' AI Usage for Availability. Questions have been taken from a scale which is developed by Bancoro, 2024 will be used in this study, which includes 5 questions, measured on a Likert scale [very poor (1) very good (5)].

Section E includes questions to measure academic performance (Appendix B). These questions have been taken from a scale to measure Academic performance, developed by

Bancoro (2024). The scale includes 5 questions, measured on a Likert scale [Never (1) Always (5)]. The higher the score, the better the academic performance.

Data Analysis

- Reliability analysis

The independent variable of this study is the use and attitude towards artificial intelligence and the dependent variable for this study is academic performance. SPSS 25 is used for data analysis, descriptive statistics and regression analysis. Reliability analysis results are shown in table 1 as Cronbach's alpha value is acceptable for AI usage attitude which is 0.783 and for academic performance is 0.925.

Table 1

Reliability results

	Items	α
AI usage attitude	153	0.783
Academic performance	045	0.925

Results

Sociodemographic results

According to the results shown in Table 2, there are 73 respondents in this study. The majority of respondents (52.1%) are between the ages of 22 and 23, with 54.8% identifying as male and 45.2% as female. A sizable percentage (67.1%) of respondents are majoring in social sciences. Furthermore, 39.7% of respondents reported a monthly household income of 300,000 PKR or higher. Furthermore, 63% of respondents are in their final year and 75.3% live in urban regions.

Table 2

Descriptive statistics of demographic values (N=73)

Variables	F	%
Age		
18-19	01	1.40
21-22	21	28.8
22-23	38	52.1
24-25	13	17.8
Gender		
Female	33	45.2
Male	40	54.8
Major		
Social sciences	49	67.1
Life sciences	09	12.3

Humanities	04	5.50
Computer science	11	15.1
Household Income per month		
50,000-99,000 PKR	17	23.3
100,000-199,000 PKR	16	21.9
200,000-299,000 PKR	11	15.1
300,000 and above PKR	29	39.7
Year of study		
Freshman	01	1.4
Sophomore	07	9.6
Junior	19	26.0
Senior	46	63.0
Reginal belonging		
Urban	55	75.3
Rural	18	24.7

AI usage and attitude

Table's 3 descriptive statistics on AI usage and views show that respondents' perceptions of AI were largely positive. The significant majority (76.7%) concur that artificial intelligence (AI) has many useful uses, and 79.5% find AI exciting. Furthermore, more than half (52.1%) say AI can improve wellbeing, and 65.8% think it could open up new economic prospects for the nation. However, views on its advantages for society are more split; only 47.9% of respondents believe that society will gain from an AI-dominated future. The table's descriptive statistics on AI usage and views show that respondents' perceptions of AI were largely positive. The vast

majority (76.7%) concur that artificial intelligence (AI) has many useful uses, and 79.5% find AI intriguing.

Table 3: Descriptive statistics of AI usage and attitude				
Variables	Disagree/Neutral		Agree	
	f	%	f	**%**
There are many beneficial applications of artificial intelligence.	17	23.3	56	76.7
AI can have positive impacts on people's wellbeing.	35	47.9	38	52.1
AI is exciting	15	20.6	58	79.5
AI can provide new economic opportunities for this country	25	34.2	48	65.8
AI system can perform better than humans	56	75.7	17	23.5
Much of the society will benefit form a future full of AI	38	52.1	35	47.9
I am interested in using AI system in my daily life	29	39.7	44	60.3
For routine transactions, I would rather interact with and AI system than with	40	68.5	23	31.5

AI intelligence makes me feel great about human ingenuity	54	73.9	19	26
An AI agent would be better than an employee in many other routines	54	74.9	19	26.0
I would like to use AI in my own job	36	49.3	37	50.7
AI systems can help people feel happier	49	67.1	24	32.9
Some complex decisions are best left to AI system	45	61.6	28	38.4
I love everything about AI	60	8202	13	17.8
I would entrust my life savings to an AI investment system	61	83.6	12	16.4

Relationship of attitudes and use of AI with academic performance

Table 4 shows the results of linear regression between AI usage attitude and academic performance of university students. A significant regression equation was found (p=0.000). The results show that the higher the AI usage attitude higher the academic performance of university students (t= 4.162).

Table 4

Simple Linear Regression results showing association of AI usage attitude with academic performance

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	14.753	3.545		4.162	.000	7.684	21.822
Artificial usage attitude	.127	.105	.142	1.209	.231		
F score=1.461, df=1-72							

Relationship between wealth and academic performance

Table 5 represents the result of mean comparisons using independent samples t- test. The second hypothesis predicted that students from higher wealth backgrounds will use more AI and have better academic performance. We found that students from higher wealth backgrounds have better academic performance, and that this was a significant result (M=20.50, compared to 18.82 for lower wealth background students; p=0.027). We did not find any significant results for the association between wealth background and AI usage.

Table 5 Mean comparisons using Independent sample T tests			
Results for wealth background and association with academic performance			
	Mean (SD)	T	P value
PKR 50,000-99,999	18.82 (5.24)	1.153	**0.027**
PKR 100,000-199,999	20.50 (2.58)		

Results for wealth background and association with use of AI			
PKR 50,000-99,999	34.17 (7.29)	0.196	0.380
PKR 100,000-199,999	32.87 (4.95)		

Discussion

The results of this study have demonstrated the key relationship between college students' academic achievement and AI usage. One major finding of this study is that the majority of the students have a positive attitude toward AI, the most of them claim it can enhance well-being, deliver a broad spectrum of applications, and create job opportunities. Consistent with previous research that speaks about AI as a tool that will help increase output, facilitate operations, and stimulate creativity (Noy & Zhang, 2023; Li & Jan, 2023). Concerns about AI's more general societal impact, however, are noted in the fact only 47.9% of the respondents in this study feel that the impact of AI in the future of society will be mainly positive. This is also in line with discussions about the moral issues such as algorithm prejudice and data privacy. (Li & Jan, 2023).

Moreover, the outcomes are indicative of a very positive link between students' academic accomplishment and their view of AI. It means the students who are positive toward AI and are more interested in its possible applications are typically better in academic performance. Such a result aligns with other studies arguing that AI technologies, such as ChatGPT or QuillBot, can contribute to learning through the increased output, improvement in writing, and the inclusion of students in academic projects (Mohammad et al., 2024). The students who have a positive attitude toward AI, then, may be better in their studies, which can be the fact of time saved by AI-supported systems.

A remarkable conclusion of the research was that there was no substantial relationship between AI usage and economic background. This means that, as opposed to other kinds of educational technology, providing the AI tools and resources might not be that costly. It further demonstrates the fact that AI technology is becoming more and more accessible and in turn

might be allowing students from all economic statuses to benefit from it. Nevertheless, pupils from higher-income families who, according to the study, performed better in school, were thus found to be the highest-income bracket students. This is true of the greater number of studies on educational inequality, which indicate that privileged students regularly come into contact with high-quality resources, their environments, and the academic support offered (Méndez-Suárez et al., 2023). This is in line with the comprehensive research on the matter of educational inequality, which shows that, more often than not, the rich children have at their disposal the best resources of any kind, starting from learning environments and passing through the academic support (Méndez-Suárez et al., 2023).

Recommendations

All in all, a positive relationship is found between two variables: AI usage attitudes and academic performance. Moreover, the results of this study shows that students with higher wealth backgrounds are most likely to have better academic achievement as other resources are accessible for them. On the other hand there is no association found between AI usage attitude and wealth background. This study suggests that making AI part of the formal university curriculum, teachers should give training on AI technologies and support should be provided to the students from lower wealth backgrounds to access the resources they lack to improve their academic performance.

Limitations

The small sample size and perception-based survey responses are two of the study's limitations. The study may not be representative of a larger population from other places because it is restricted to one university and one specific region.

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Appendix A: Informed Cover Letter

Informed Cover Letter Date: _____

 Dear Participants,

You are invited to participate in a study titled: "The Relationship between General Attitudes and Usage of Artificial Intelligence on Academic Performance of University Students". The aim of the study is to investigate if there is a relationship between uses of artificial intelligence (AI) on the academic performance of university students of Punjab. The questionnaire will take approximately 10-15 minutes to answer. There is no compensation for responding nor is there any kind of known risk. Your names are not required for participation and none of your individual data will be disclosed or shared. The data will remain with the researcher and analyzed without compromising confidentiality or anonymity. Your participation in this study is completely voluntary and you have the right to withdraw from answering the survey at any point. By signing this form, you agree that you have read the above information and are indicating your consent to participate in this research study.

Thank you! Researcher:

 Fannie Mehak

BSc. Hon Student, Department of Sociology, Forman Christian College

 Email Address: 240520398@formanite.fccollege.edu.pk

Signed consent of the participant:

Appendix B

Section A: Socio-Demographics

Item				
1.Age	18 to 19	20 to 21	22 to 23	24 to 25
2.Gender	Male	Female	Transgender	Prefer not to say
3.Major				
4.Year of study	Freshmen	Sophomore	Junior	Senior
5.Monthly Household Income (PKR)	PKR 50,000-99,999	PKR 100,000-199,999	PKR 200,000 -299,999	PKR 300,000 and above
6.Regional belonging	Rural	Urban		
7.Provincial belonging				

Section B: The General Attitudes towards AI (Schepman, & Rodway,2020)

	Disagree (1)	Neutral (2)	Agree (3)
There are many beneficial applications of artificial intelligence.			
I am impressed by what AI can do.			
AI can have positive impacts on people's wellbeing.			
AI is exciting			
AI can provide new economic opportunities for this country			
AI system can perform better than humans			
Much of the society will benefit form a future full of AI			
I am interested in using AI system in my daily life			

For routine transactions, I would rather interact with and AI system than with			
AI intelligence makes me feel great about human ingenuity			
An AI agent would be better than an employee in many other routines			
I would like to use AI in my own job			
AI systems can help people feel happier			
Some complex decisions are best left to AI system			
I love everything about AI			
I would entrust my life savings to an AI investment system			

Section C: Extent of the Students' AI Usage for Functionality

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)

1. I use AI tools because it makes my academic requirements easier					
2. I use AI tools in supporting my initial draft of my academic requirements					
3. I use AI tools whenever I feel my output is lacking or inadequate					
4. I use AI tools whenever I encounter a low or failing grade in my previous submissions					
5. I use AI tools to finish my requirements quickly and efficiently					

Section D: Extent of the Students' AI Usage for Availability (Bancoro, 2024)

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)
1. I use AI tools because they are accessible					
2. I can easily assess and use AI tools without struggling					
3. I can use AI tools anytime					
4. I can use AI tools in any type of academic requirement					

5. I can use AI tools in any type of device (smartphones, laptop, tablet)					

Section E: Academic performance (Bancoro, 2024)

	Very Poor (1)	Poor (2)	Fair (3)	Good (4)	Very Good (5)
1. Rate your overall academic performance based on your general average in the previous semester					
2. Consistency in achieving high final grades in different courses					
3. Performance trends in assessment scores from the previous term semester					
4. Describe the feedback received from previous instructors					
5. Describe the assessment performance (e.g. exams, recitation, papers) from the previous term semester					

Appendix C: IRB Approval Certificate

FORMAN CHRISTIAN COLLEGE
(A CHARTERED UNIVERSITY)

INSTITUTIONAL REVIEW BOARD
APPROVAL CERTIFICATE

IRB Ref: IRB-625/01-2024

Date: 04-06- 2024

Project Title: The Relationship between General Attitudes and Usage of Artificial Intelligence on Academic Performance of University Students.

Principal Investigator: Fannie Mahek

Supervisor: Dr. Sara Rizvi Jafree

The Institutional Review Board has examined your project in the IRB meeting held on 04-06-2024 and has approved the proposed study. If during the conduct of your research, any changes occur related to participant risk, study design, confidentiality or consent, or any other change then IRB must be notified immediately.

Please be sure to include the IRB reference number in all correspondence.

Dr. Sharoon Hanook
Convener-IRB
Chairperson Department of Statistics
Forman Christian College
(A Chartered University)
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