

Digital Disruption in Tertiary Education in the Age of Artificial Intelligence: A Cross-Sectional Mixed Method Study

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Abstract

The study primarily focused on examining the impact of digital disruption on tertiary education in the age of Artificial Intelligence, emphasizing exploring the nature of AI-driven disruption in tertiary education. A cross-sectional mixed-method approach was followed to collect data through an online survey from 450 participants. The study utilizes the Statistical Package for Social Sciences (SPSS) version 25 to analyze the data. The study results show that more than 90% of respondents are familiar with Artificial Intelligence (AI) and use it in their studies. Among them, 45.2% use AI frequently, 26.2% occasionally, and 21.2% always. 27.8% of respondents use AI for learning assistance, followed by (21.9%) for research, (17%) for creative projects, (19.6%) for personal use, (13.1%) for social activities, and other purposes. ChatGPT was the respondents' most frequently used AI tool (90.4%), followed by Gemini, QuillBot, and Grammarly. Among them, 43% said they are very likely to use AI due to free access. In comparison, 44% are likely to use it due to task automation, followed by personalized summaries, peer use, and popularity. Based on the Chi-square test results ($p = 0.194 > 0.05$), there is no statistically significant relationship between gender and the frequency of AI usage among the respondents. Participants reported that the key challenges they face in integrating AI into their education are (56.7%) similarity in outcomes, (57.7%) inaccuracy of information, (60.6%) over-reliance on AI, and (48.1%) the cost of the premium version.

Keywords: Artificial Intelligence (AI), Digital Disruption, Tertiary Education, Mixed-Method.

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Introduction

Rapid advancement of artificial intelligence is changing the dynamics of multiple sectors in society, including the area of education. AI involves the creation of computer system that is capable of executing task traditionally linked to human intelligence (Ertel, 2018). It offers a remarkable opportunity to customize learning experiences allowing students to follow personalized pathways to enhance academic performance (Alam, 2021). The system of AI can analyze vast amount of data through the use of algorithm and data analysis, offering opportunities to make actionable insight, improving student engagement and learning outcomes (Osman et al., 2024).

In recent years, AI has begun to play a vital role in enhancing the flexibility and accessibility of tertiary education. AI has expanded educational boundaries, allowing for personalized learning pathways that can adapt to the unique needs of students (Simi, 2023). However, all these advancements are also accompanied by the concerns of ethical implications, data privacy issues, and the potential for conventional teaching methods have been replaced (Zhou, 2023). As artificial intelligence continues to develop and gain popularity in educational settings, these opportunities and challenges must be thoroughly examined (Alam, 2021).

The integration of artificial intelligence in tertiary education while reinforcing the educational outcomes, it also led to a series of challenges that must be addressed. Moreover, there is a pressing need to acknowledge how AI is perceived by both educators and students and what are the factors that influence the successful integration of AI tools into existing pedagogical framework. Without cautious consideration, the digital disruption brought about by AI could lead to unintended consequences for the quality and equity of education (H M Atif Wafik, 2024).

Although the impact of artificial intelligence (AI) on higher education has been the focus of many studies, the majority of these studies concentrate on developed nations, leaving a gap in our understanding of how AI is viewed and applied in developing countries (Ajay Agrawal, 2017). Furthermore, the majority of the research currently in publication tends to concentrate on technical capabilities rather than a thorough examination of the practical difficulties and variables influencing its integration in higher education. To fully understand the impact of AI on tertiary education, it is important to explore how these technologies are currently being used, what are existing challenges and how educational institutions can effectively manage the digital disruption that AI presents. Exploring the potential of AI in higher education, especially in the context of digital disruption, is what has motivated the study. This research attempts to offer insights that can assist institutions in directing the changing educational practices by investigating the advantages, difficulties, and adoption factors of AI tools in higher education.

Literature Review

Artificial Intelligence

The discipline of artificial intelligence (AI) is focused on developing intelligent machines, especially intelligent computer programs. Although it has to do with utilizing computers to study human intelligence, artificial intelligence (AI) is more than only biologically based techniques. AI aims to do more than replicate human thought processes also it aims to create intelligent systems (McCarthy, 2007). Artificial Intelligence (AI) has the potential to significantly reduce the expense while also improving the availability of prediction, making it more easy and accessible to use existing data to provide new insights (Ajay Agrawal, 2017). Although technologies in AI have the potential to significantly enhance several aspects of human life, including housing, healthcare, education, employment, entertainment, safety,

and transportation. Innovative services, smart goods, and new business methods may also be very beneficial to businesses but AI is not a panacea for every issue (Berente, 2021).

Application of AI on tertiary education

Saikat (2024) states education is changing and our learning process is being profoundly impacted by the increasing influence of artificial intelligence (AI). Since artificial intelligence is developing so quickly, educators need to know how to use these tools for improving students' achievement. To ensure that AI tools are utilized in ways that effectively enhance teaching and learning, close cooperation between educators and AI learners is needed.

According to Xianghan (2023) in order to identify AI affordances from and within the higher education sector, university senior management teams need to establish an environment at the institutional level that promotes and provides suitable technical environments as well as opportunities for enhancing the skill set of academic tutors.

James (2022) investigates the potential of AI in education, IT must be involved in every step of integrating AI into support services for students, faculty, and staff. AI has the potential to improve performance, increase information availability, and enhance communication. AI is transforming the way that teachers educate, but it won't replace them. AI mentors are helping instructors improve, which is definitely a positive factor. AI mentors might eventually take the role of teaching assistants, and customized AI mentors that offer specialized help, particularly in math and science may become usual.

Marzia (2024) explores there has been a notable presence of young AI users, as seen by the significant proportion of undergraduate students (91.1%) in the sample group. This group, which is often tech-savvy and quick to

embrace new technology, is especially essential when examining the effects and use of AI tools in the classroom. Atif (2024) stated that the use of AI in Bangladeshi education is subject to debate. Supporters point to AI's capacity for individualized education, while critics raise issues of human aspect, ethics, and equity. This calls for an in-depth examination of AI's function in education in Bangladesh's particular setting. Critics believe that by generating personalized learning experiences, AI may transform education and eventually result in a more efficient and interesting system, pointing to worldwide developments.

Robert (2024) noted that although integrating AI has great potential to enhance both student results and higher education but not much has been discovered about the factors that influence university students' adoption of AI, particularly those studying in the economics levels.

Suvrat (2019) discusses that higher education is lagging behind the corporate sector in terms of AI adoption and implementation. Many businesses that have previously adopted AI and are still investing in it's applications are certain to remain ahead of the competition. Institutions of higher learning that integrate AI into every curriculum continue to lead their fields and already take advantage of the advantages of this technology.

According to Kershnee (2024), the legitimacy of online tests is being called into question by AI chatbots, therefore educators must change their strategy. These days, assessments need to focus on higher-order thinking, problem-solving, creativity, and teamwork. In order maintain integrity, authentic assessments such as project-based assignments, open-ended activities, and collaborative assessments are necessary since they are challenging for AI chatbots to do and more accurately measure these crucial skills.

Additionally, Habeeb (2024) stated that the use of AI in higher education and work engagement is influenced by a number of factors, such as awareness, performance expectancy, and perceived risk. Attitude and behavior act as mediators for these factors. Also, higher education institutions in Asia are increasingly implementing AI technologies such as chatbots, automated grading, and intelligent tutoring. AI adoption rates, however, differ between nations and organizations.

According to Omar (2023) despite its widespread use, ChatGPT and other generative AI models are unable to replicate the job of a human instructor since they do not simulate real human interaction. The growing use of AI in education raises questions over the declining importance of face-to-face contact and teamwork, which are essential components of a strong educational system, even as it transforms learning and information access.

Moses (2024) states that academics and higher education administration should take measures to enhance the application of AI in academic settings. It suggests that in order to discourage plagiarism, educational institutions should set specific rules for faculty and students' adoption and use of AI. A study by David (2023), explored that although AI is useful and generative models are based on statistical patterns and lack a complete understanding of any topic. his limits their ability to provide each student individualized explanations and comments based on their needs and misunderstandings.

Methodology

Research Design

The mixed-method research follows a cross-sectional study to evaluate the impact of digital disruption in tertiary education in the age of artificial intelligence (AI). The quantitative study is accompanied by an evaluation and investigation of the ways in which AI-powered technologies impact higher

education teaching and learning procedures. It focuses on understanding the extent to which AI-driven tools are integrated into academic activities and the factors affecting their adoption. The qualitative study is incorporated to explore the challenges and prospects associated with AI-driven disruption in tertiary education and presents recommendations for the existing scenario.

Research Method

This mixed-method study used a survey questionnaire that included closed and open-ended questions. It has employed non-probability purposive sampling by focusing on a particular demographic of students enrolled in higher education and who are actively using AI-powered resources for their academic work. This method of sampling ensures relevance to the study's objectives and allows data gathering from people with specific experience. The possibility of achieving an adequate sample size was demonstrated by the 450 people chosen at random.

Table 1: Research Methodology of the Study

Research Design	Qualitative and Quantitative
Research Method	Survey Questions – 450 (Respondents)
Sampling Method	Non-probability (Purposive Sampling)

Data Analysis Techniques

The study applied SPSS (Statistical Package for Social Sciences) version 25, to analyze the data. Non-parametric statistical tests were applied as the data was not normally distributed, based on the Shapiro-Wilk and Kolmogorov-Smirnov tests ($p < 0.05$). To explore relationships among the variables in the data the study employed the Chi-square test as non-parametric statistical tests. The 95% confidence level used to calculate the data suggests that the estimated findings should fall within the calculated confidence

ranges. A 5% level of error (0.05) was also taken to be considered in the study to minimize the possibility of making an error.

Table 2: Data Analysis Techniques

Data Analysis	Analysis Techniques
Uni-variate analysis	Frequency distribution, percentage
Bi-variate analysis	Chi-square test
Data Validity	Data normality test

Findings

Socio-Demographic Profile of the Participants

Table 3 represents the socio-demographic profile of the participants of the respondents (n=450). The age group distribution shows that the age range of (20-24) includes the majority (92.3%) of the respondents, followed by (25-29) of age with 5.8%, (below 20) of age range with 1.1% and (30 and above) 1% belongs to the age group. In terms of gender, 45.2% of respondents were women and 54.8% were men. Currently, the majority of respondents (85.6%) are enrolled in their Honors (Bachelor's) program, while 14.4% are pursuing a Master's degree. The fields of study of the respondents are as follows: Science (37.5%), Business Studies (17.3%), Arts and Social Sciences (43.3%), Diploma in Nursing Science and Midwifery (1%), and Apparel Manufacturing Technology (1%).

Table 3: Socio-Demographic Profile of the Participants

Demographic Characteristics	Percentage (%)
Age	
Below 20	1.1%
20-24	92.3%
25-29	5.8%
30 and above	1%

Gender	
Male	54.8%
Female	45.2%
Current Academic Program	
Honors (Bachelor's) Degree	85.6%
Masters' Degree	14.4%
Field of Study	
Science	37.5%
Business Studies	17.3%
Arts and Social Science	43.3%
Diploma in Nursing Science and Midwifery	1%
Apparel Manufacturing Technology	1%

Background Information of the Participants About the Use of AI in Tertiary Education

Table 4 presents that 98.1% of respondents are familiar with Artificial Intelligence (AI) and use it in their studies. Among them, 45.2% use AI frequently, 26.2% occasionally, and 21.2% always. Among the respondents (27.8%) use AI for learning assistance, followed by (21.9%) for research, (17%) for creative projects, (19.6%) for personal use, (13.1%) for social activities, and other purposes. ChatGPT was the respondents' most frequently used AI tool (90.4%), followed by Gemini (66.3%), QuillBot (57.7%), Grammarly (54.8%) and Microsoft Copilot (23.1%). Among them, 43% said they are likely to use AI due to free access, 44% are likely to use it due to task automation, followed by 41% due to personalized summaries, and 27% due to peer use, and popularity. Among the respondents. 75% said areas that AI is greatly impacting in tertiary education, especially in student learning methods, 73.2% in assignments, 62.5% in research and 45.2% in the assessment and evaluation process.

Table 4: Current Scenario of the Use of AI in Tertiary Education

Familiar with the Concept of AI	Percentage (%)
Yes	98.1%
No	1.9%

Frequency of AI Use Among Respondents	
Frequency of AI usage	Percentage (%)
Frequently	45.2%
Occasionally	26.2%
Always	21.2%

Purpose of AI Use	
Purpose	Percentage (%)
Learning Assistance	27.8%
Research	21.9%
Creative projects	17.0%
Personal use	19.6%
Social Activities	13.1%

Types of AI Tools Use	
Tools	Percentage (%)
ChatGPT	90.4%
Gemini	66.3%
Quillbot	57.7%
Grammarly	54.8%
Microsoft Copilot	23.1%

Motivations for Using AI	
Motivation	Percentage (%)
Free access	43%
Task automation	44%
Personalized summaries	41%
Peer use and popularity	27%

Areas of tertiary education which are most affected by the Digital Disruption Caused by AI	
Areas	Percentage (%)
Student Learning methods	75%
Assignments	73.2%
Research	62.5%
Assessment and Evaluation Process	45.2%

Skills are most affected by the use of AI in education

Table 5 shows that critical thinking and judgment are the most affected skills (77.9%), followed by originality and writing (72.1%), problem solving (67.3%), creativity (52.9%) and data interpretation is the least affected (46.2%).

Table 5: Skills are most affected by the use of AI in education

Skills	Percentage (%)
Data interpretation	46.2%
Problem solving	67.3%
Critical thinking and judgment	77.9%
Originality and writing skills	72.1%
Creativity	52.9%

Chi-Square Test Analysis

The study also examined whether gender played a role in AI usage frequency. To analyze this, we have applied a chi-squared test, a statistical method used to assess the relationship between categorical variables. The P-value resulting from the test is 0.189, which is greater than the standard significance level of (0.05). There is no significant relationship between respondents' frequency of AI usage and gender, based on the results of the Chi-square test ($p=0.194>0.05$). This means that only observed differences in AI uses between genders are likely due to random variation rather than a true underlying pattern. In other words, gender does not appear to influence how often respondent engage with AI tools in their academics.

Table 6: Chi-square Test

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-square	6.070 ^a	4	0.194
Likelihood ratio	6.584	4	0.160
N of valid cases	450		

* $p>0.05$

Factors Affecting the motivation to use AI in academics

Reliability Test

The study's constructs' internal consistency is measured by reliability. A construct is considered dependable if its Alpha (α) value is greater than (0.60). Cronbach's Alpha was used to evaluate construct reliability in this study. With five items, the result indicated that academic motivation for using AI was reliable ($\alpha = .872$).

Exploratory factor analysis (EFA):

Factor Analysis using varimax rotation and principal component analysis, an EFA has been carried out. (0.50) has been chosen as the loading criterion for the minimization factor. It has also been evaluated to guarantee appropriate exploratory levels of explanation for the scale's commonality, which shows the degree of variance in each dimension. Every commonality, according to the results, is greater than (0.50).

Table 7: EFA Result

Item	Component 1	Component 2
Free access	.653	
Personalized summaries	.772	
Academic success	.886	
Automation of task		.807
Peer use and popularity		.849

The study included five items relating to the motivation to use AI in academics for factor analysis using principal component analysis (PCA) with varimax rotation. The value of Kaiser-Meyer-Olkin measure of adequacy is 0.810, which is above the recommended value of .60. Barlette's test Sphericity was significant, $\chi^2 (n = 450) = 445.857$, as the p-value is determined ($.000 < .05$). The Eigenvalue > 1 , determines that the analysis is fit for two factors explaining a total of 63.034% of the variance of the data. factor 1 component, which can be labeled as Perceived Academic Benefit,

included high loadings from items such as academic success (.886), personalized summaries (.772), and free access (.653). These items reflect the perceived academic value and utility of the system. Factor 2 component, labeled Social and Practical Utility, showed strong loadings from peer use/popularity (.849) and automation of task (.807), indicating the influence of social norms and task efficiency in shaping user perceptions. One item (free access) exhibited moderate cross-loading on both components (.653 on Component 1 and .526 on Component 2), suggesting it may be relevant to both dimensions. Overall, the rotated two-factor solution accounts for the multidimensional nature of user perceptions, distinguishing between academic benefits and practical or social considerations.

Challenges of AI Integration in Academics

Table 7 represents, that the key challenges students face in integrating AI into their education are (56.7%) similarity in outcomes, (57.7%) inaccuracy of information, (60.6%) over-reliance on AI, and (48.1%) the cost of the premium version. The study also highlights several challenges arise from the use of AI in education with varying levels of concern among respondents, (58.7%) believe AI creates disparities in Access or opportunities among students, and (62.5%) feel that relying too heavily on AI poses risk, (66.3%) think AI reduces the importance of traditional learning methods, and (65.4%) are concerned that AI increases dependence on technology.

Table 8: Challenges of AI Integration in Academics

Challenges of AI integration	Percentage (%)
Similarity in outcomes	56.7%
Inaccuracy of information	57.7%
Over-reliance on AI	60.6%
Cost of premium versions	48.1%
Challenges Arise from the Use of AI in Education	

Digital Disruption

Creates disparities in access or opportunities among students	58.7%
Poses risks when relied upon heavily	62.5
Reduces the importance of traditional learning methods	66.3%
Increases dependence on technology	65.4%

Discussion

The findings of this study highlight the growing influence of AI in tertiary education, revealing both its widespread adoption and the challenges associated with its integration. It is evident that AI has become an essential tool in higher education. The majority of the students use AI for learning assistance, research, and creative projects, indicating its role in productivity and innovation. However, the findings also raise concerns about potential drawbacks of AI-driven learning. One of the key insights from this study is the motivation behind AI adaptation is free access, and task automation which were the primary reasons for AI use, followed by personalized summaries, peer use and popularity. A significant number of respondents identified key areas where AI is making a substantial impact on tertiary education. The most prominent influence is seen in student learning methods, followed by its integration into assignments. Additionally, AI is playing an increasingly important role in research, as well as in the assessment and evaluation processes. In terms of the impact of AI on skills in education, the study finds a significant influence on critical thinking and judgment, originality and writing, problem solving, and creativity. However, data interpretation appears to be the least affected skills.

These findings suggest that students view AI as a cost-effective and efficient tool that enhances their ability to complete academic task. The popularity of AI tools like ChatGPT, Gemini, Quillbot and Microsoft Copilot, indicates a preference for generative AI models that provide instant responses aiding in research writing and comprehension. Another important finding is

the lack of statistically significant relationship between gender and AI use frequency. The study also examined whether gender played a role in AI usage frequency. The test results in P-value of (0.194), which is higher than the conventional significance level of (0.05). Based on the Chi-square test results ($p = 0.194 > 0.05$), there is no statistically significant relationship between gender and the frequency of AI usage among the respondents. This means that only observed differences in AI uses between genders are likely due to random variation rather than a true underlying pattern. In other words, gender does not appear to influence how often respondent engage with AI tools in their academics. It indicates that AI adaptation is widespread across different demographic groups, suggesting that AI is becoming universally accepted in tertiary education.

Despite these advantages, students also reported several challenges in integrating AI into their education. The most significant concern was over-reliance on AI tools, followed by information inaccuracy, similarity in outcomes and cost of the premium AI tools. Several challenges arise from the use of AI in education, with a significant number of people believing that AI creates disparities in access to opportunities among students. Many feel that relying too heavily on AI poses risks, while others believe that it diminishes the importance of traditional learning methods. Additionally, there is a concern that AI increases dependency on technology. These findings create a debate on the risk of AI in education via excessive dependence on AI-generated content can reduce critical thinking, skills and originality in academic work. Additionally, the data issue of information accuracy highlights the need for students to critically evaluate AI-generated content rather than relying on it unconditionally.

Conclusion and Recommendation

The innovation of technology is constantly reshaping the educational practices, where artificial intelligence represents a significant shift in teaching and learning paradigms (Ajay Agrawal, 2017). The result of the study suggested that AI tools have gained popularity among tertiary students, reflecting their perceived value in enhancing their academic efficacy. Despite the evident benefits, several concerns hamper the seamless education practices. These concerns indicate that while AI provides convenience, it may also compromise on originality, accuracy and the deliberate problem-solving abilities of the students. The result of the study suggests that AI adoption is widespread and not influenced by gender-specific preferences or access.

Although AI improves learning experiences, responsible usage is necessary to ensure that it serves as a tool for academic support rather than a replacement for human intelligence (Ertel, 2018). To maintain the quality of educational outcomes the consequences of unethical AI use such as plagiarism and misinformation should be implemented in academic institutions. Institutions should apply regulations that promote responsible AI use to encourage students to verify AI generated information and maintain accountability in their academics. Educators play a crucial role in AI integration. Teachers and academic institutions should motivate students to use this technological advancement as a complementary learning tool rather than a substitute for traditional settings. Also, students should develop independent analytical skills rather than relying fully on AI-generated responses. Teachers should assign those tasks which require critical thinking, peer collaboration and real-life problem-solving techniques. A combined learning method which includes AI-driven learning with teacher-student interaction, can help to mitigate the risk of AI dependency. Human cognition of education such as mentorship, critical thinking and personalized guidance of educators should be preserved. This study offers insightful information

about the applications and challenges of AI in higher education, but it has certain limitations. The study primarily relies on survey data, which may not capture all aspects of AI integration and further implications. Moreover, the findings are based on a specific demographic as a result the outcome may vary in different educational context. To understand how AI affects student performance over the long run and how it functions in various educational contexts, future research should concentrate on longitudinal studies. Institutions must continue to take the initiative to develop AI-based educational systems as the technology develops. AI shouldn't be seen as a substitute for human intelligence and creativity, but rather as a tool that enhances conventional schooling.

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