

Impact of Artificial Intelligence on Tertiary Level Education in Bangladesh: A Comparative Analysis of Positive and Negative Effects

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This Report Presented in Partial Fulfillment of the Requirements for
The Degree of Masters of Science in Computer Science and Engineering

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APPROVAL

This Project/Thesis titled “**Impact of Artificial Intelligence on Tertiary Level Education in Bangladesh: A Comparative Analysis of Positive and Negative Effects**”, submitted by **Md. Asaf-Ud-Dowlla**, ID No: 0242310005103010 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of M.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 06-07-2024.

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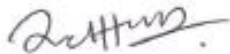


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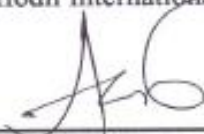


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I hereby declare that, this thesis has been done by me under the supervision of **Dr. Md. Fokhray Hossain, Professor, Department of CSE** Daffodil International University. I also declare that neither this thesis nor any part of this thesis has been submitted elsewhere for award of any degree.

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ABSTRACT

This thesis explores the integration of Artificial Intelligence (AI) in tertiary-level education in Bangladesh, examining the perceptions, usage, and impact of AI among students from various universities. A survey conducted with 787 respondents from private, public, national, and other tertiary institutions revealed that 70.6% of students are familiar with AI in education, with 73.4% having used AI-powered tools. A significant majority (69.1%) believe AI can be beneficial for tertiary education, and 71.8% feel that AI enhances their learning experience. However, there is a notable degree of skepticism, with 51.3% feeling guilty about using AI for assignments, and 72.5% believing stricter regulations are necessary. Comparative analysis with global data highlights that Bangladeshi students are more familiar and optimistic about AI's benefits compared to their global counterparts. While 73.5% of Bangladeshi students reported improved grades due to AI, 63.4% believe it makes the education system more effective and efficient. The study also reveals significant gaps in satisfaction with current technology integration, with only 15.7% expressing satisfaction, indicating a need for further development in this area. The findings underscore the potential of AI to transform tertiary education in Bangladesh, while also pointing to areas for improvement and the need for balanced regulations. Future research should focus on increasing the survey population to include a more diverse range of institutions and disciplines, and consider longitudinal studies to track the evolving impact of AI in education.

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CHAPTER 1

INTRODUCTION

1.1 Background of the research

The field of education is not excluded from the revolutionary power of artificial intelligence (AI). AI technologies have the power to completely transform administrative, instructional, and learning processes in higher education. AI integration makes promises, but there are also worries about the possible advantages and disadvantages for students. In light of Bangladesh's tertiary education system, it is imperative to comprehend these implications in order to make well-informed decisions and build policies.

1.2 Aim of the research

The main aim of this research project is to explore the impact of intelligence, on higher education in Bangladesh considering both its positive and negative aspects. Our focus will be on examining how AI can be utilized to enhance achievements improve accessibility and equip students with the skills to succeed in a job market influenced by AI technology. Additionally, we plan to evaluate the drawbacks of AI on students' academic performance, overall development and educational experiences. By analyzing the benefits and drawbacks of AI integration in education this study aims to provide a perspective, on the matter.

1.3 Problem Statement

Bangladeshi universities are beginning to investigate the use of AI in the classroom. This is interesting because artificial intelligence (AI) has the potential to improve learning efficiency and personalization. It may even enable distant learners to receive a top-notch education. But there are also some worries. The potential effects of AI on students learning and overall development are yet not fully understood. Some fear that students may find it more difficult to think critically and come up with independent solutions as a result of AI. Additionally, there's a worry that AI can be biased, favoring some students over others.

The significance of this study's work lies in its ability to provide light on the pros and cons of implementing artificial intelligence in education. We can create policies to ensure AI is

utilized in a way that benefits students and doesn't have any bad effects by researching how it affects university students in Bangladesh.

1.4 Research Methodology

To achieve the research objectives, a mixed-methods approach will be employed. A thorough literature review will provide insights into existing studies on AI's impacts on student learning and well-being. Surveys and focus group discussions will then be conducted among tertiary level students in Bangladesh to gather firsthand perspectives on AI integration. Data analysis techniques will be utilized to identify patterns and themes related to both positive and negative impacts of AI on students.

1.5 Proposed Solution

Building upon the research findings, this study will propose strategies and recommendations to optimize the positive impacts of AI while addressing its negative effects on students. These recommendations will focus on enhancing digital literacy, promoting ethical AI use, and supporting students' socio-emotional well-being in the AI-driven educational landscape.

1.6 Conclusion

In conclusion, this research wants to find out all the good and bad things about using AI for teaching in universities in Bangladesh. By looking at both the advantages and disadvantages, this study aims to help people make informed decisions about how to use AI in education. We want to make sure AI helps students learn more and better, not the other way around.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The landscape of tertiary education in Bangladesh is on the point of a significant transformation. Artificial intelligence (AI) is rapidly emerging as a potential game-changer, promising to personalize learning, enhance accessibility, and revolutionize teaching methods. However, alongside this exciting potential lie a number of challenges that require careful consideration. This literature review delves into the existing research on the impact of AI integration in tertiary education, specifically focusing on the Bangladeshi context. Our aim is to provide a balanced perspective by analyzing both the positive and negative effects of AI on student learning and well-being. Through a comparative analysis of existing studies and relevant data, we aim to shed light on how AI can be harnessed to optimize the learning experience for Bangladeshi students while mitigating any potential drawbacks. This review will be a crucial first step in shaping a future where AI empowers students and fosters a vibrant and effective educational ecosystem in Bangladesh.

2.2 Literature Review

The landscape of tertiary education in Bangladesh is undergoing a period of significant transformation. Artificial intelligence (AI) is emerging as a potent force, with the potential to personalize learning experiences, enhance accessibility, and revolutionize teaching methods. However, alongside these exciting possibilities lie a number of challenges that require careful consideration. This literature review delves into the existing research on the impact of AI integration in tertiary education, with a specific focus on the Bangladeshi context.

Globally, AI in education has been widely studied, with numerous applications aimed at enhancing learning experiences, personalizing education, and improving administrative efficiencies. AI technologies such as intelligent tutoring systems, adaptive learning platforms, and predictive analytics are increasingly prevalent.

Positive Impacts:

1. **Personalized Learning:** AI-driven systems can tailor educational content to individual student needs, improving learning outcomes. Studies show that adaptive learning technologies can significantly enhance student performance and engagement [1].
2. **Administrative Efficiency:** AI can streamline administrative tasks such as enrollment, grading, and student support services, allowing educators to focus more on teaching and research [2].
3. **Enhanced Accessibility:** AI tools can provide better accessibility for students with disabilities, offering speech-to-text, text-to-speech, and other assistive technologies [3].

Negative Impacts:

1. **Data Privacy Concerns:** The use of AI in education involves collecting and analyzing large amounts of student data, raising concerns about data privacy and security [4].
2. **Job Displacement:** The automation of administrative and teaching tasks might lead to job displacement among educational staff [5].
3. **Equity Issues:** There is a risk that AI could exacerbate existing inequalities in education, particularly if access to advanced technologies is uneven [6].

AI in Education: The Context of Bangladesh

The integration of AI in tertiary education in Bangladesh is still in its nascent stages, with several initiatives and pilot projects underway. The country's educational institutions are

exploring AI applications to enhance the quality of education and manage growing student populations.

Positive Impacts in Bangladesh:

1. **Improved Learning Outcomes:** Initial implementations of AI in Bangladeshi universities show promise in enhancing student learning experiences. AI tools are being used to provide personalized learning paths, which have been associated with improved academic performance [7].
2. **Resource Optimization:** AI can help optimize resource allocation in universities, ensuring that educational resources are used more efficiently. This is particularly important in Bangladesh, where educational resources are often limited [8].
3. **Support for Faculty:** AI systems can assist faculty members by automating routine tasks such as grading and administrative work, allowing them to dedicate more time to research and student interaction [9].

Negative Impacts in Bangladesh:

1. **Technological Barriers:** Many institutions face significant technological barriers, including inadequate infrastructure and limited access to high-quality AI tools. These challenges can hinder the effective implementation of AI in education [10].
2. **Digital Divide:** There is a substantial digital divide in Bangladesh, with disparities in access to technology between urban and rural areas. This divide can limit the benefits of AI to only a portion of the student population, potentially increasing educational inequality [11].
3. **Cultural Resistance:** The integration of AI in education can encounter resistance from faculty and students who are accustomed to traditional teaching methods. Cultural attitudes towards technology and change management are critical factors influencing the success of AI initiatives [12].

2.3 Comparative Analysis

The comparative analysis of the positive and negative effects of AI integration in tertiary education in Bangladesh reveals a complex landscape. While the potential benefits are significant, including improved learning outcomes, resource optimization, and enhanced support for faculty, the challenges are equally substantial. Technological barriers, digital divide, and cultural resistance are critical issues that need to be addressed to realize the full potential of AI in education.

2.4 Scope of the Problem

This thesis explores the impact of integrating artificial intelligence (AI) into tertiary education in Bangladesh, examining its positive and negative effects. It focuses on universities, colleges, and other higher education institutions across the country, both public and private. The study investigates how AI affects learning experiences, administrative efficiency, student engagement, access to education, and research support positively, while also considering concerns such as the digital divide, privacy, ethical issues, technological dependency, job displacement, and implementation challenges. It looks at how students, educators, administrators, and institutions are influenced and employs various research methods like surveys, interviews, and focus groups to analyze these impacts. Additionally, it compares differences across public and private institutions, academic disciplines, and urban and rural areas, aiming to inform future educational policies and practices in Bangladesh.

2.5 Challenges

This thesis on the impact of artificial intelligence (AI) integration on tertiary level education in Bangladesh will encounter several challenges, spanning methodological, practical, and contextual aspects. Addressing these challenges is crucial for producing a comprehensive and credible analysis.

Methodological Challenges

Obtaining reliable and comprehensive data from various educational institutions can be difficult due to privacy concerns, bureaucratic hurdles, and inconsistent record-keeping

practices. Balancing the collection and analysis of quantitative data (e.g., surveys, usage statistics) with qualitative insights (e.g., interviews, focus groups) is complex, and ensuring that both types of data are adequately represented and integrated into the analysis is essential. Ensuring that the sample includes a representative mix of institutions (public and private), academic disciplines and geographic locations (urban and rural) to draw valid and generalizable conclusions is challenging. Avoiding biases in data collection and ensuring that findings are applicable across different types of institutions and student demographics is crucial. Establishing clear and consistent metrics for comparing the impacts of AI across different institutions, disciplines, and geographic areas, and accounting for the rapidly evolving nature of AI technologies and their adoption in education, which can make it challenging to draw long-term conclusions, are also significant challenges.

Practical Challenges

Many institutions, particularly in rural areas, may lack the necessary infrastructure to effectively implement and benefit from AI technologies. Assessing the extent of these limitations and their impact on AI integration is crucial. Ensuring ongoing technical support and maintenance of AI systems can be a significant challenge, particularly for resource-constrained institutions. There is a need for educators to be trained in using AI tools and integrating them into their teaching methodologies, with resistance to change and lack of familiarity with technology potentially hindering this process. Ensuring that students have the necessary digital literacy skills to effectively engage with AI-enhanced learning environments is also essential. Addressing concerns related to the collection, storage, and use of student data by AI systems, ensuring compliance with data protection regulations, and maintaining student privacy are critical. Examining the ethical implications of AI in education, including potential biases in AI algorithms and the impact on equity and fairness in educational outcomes, is also necessary.

Contextual Challenges

The significant disparity in access to technology and internet connectivity between urban and rural areas can exacerbate existing educational inequalities. Socioeconomic barriers

affect access to AI technologies and related educational resources, impacting both students and institutions. Navigating the regulatory landscape concerning AI in education, including government policies, funding mechanisms, and institutional guidelines, is complex. There is potential resistance from institutional leadership and stakeholders to adopt and integrate AI technologies due to cost concerns, fear of change, or lack of awareness of the benefits. Varying levels of acceptance and trust in AI technologies among students, educators, and administrators, and cultural attitudes towards technology adoption, can influence the success of AI integration. Additionally, the predominance of English in AI tools and resources may pose challenges in a country where many students and educators are more comfortable with Bangla.

2.6 Conclusion

The integration of AI in tertiary level education in Bangladesh holds great promise but also presents significant challenges. By learning from global experiences and addressing local issues, Bangladesh can harness the power of AI to enhance its educational system. Future research should focus on longitudinal studies to better understand the long-term impacts of AI in education and develop best practices for its implementation in diverse educational contexts.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter summarizes the research procedure used in this study, focusing on the sampling methods, techniques, data gathering, and data examination procedures. The aim is to investigate the impact of artificial intelligence (AI) integration on tertiary level education in Bangladesh, comparing its positive and negative effects.

3.2 Sampling Method

The study uses a quantitative research approach to gather data through an online survey distributed via Google Forms.

Population: The target population includes students, faculty members, and administrative staff from various tertiary institutions in Bangladesh.

Sampling Frame: A list of tertiary institutions in Bangladesh, with an emphasis on a diverse range of departments and programs.

Sample Size: Determined grounded on statistical deliberations to ensure adequate representation, with efforts to maximize response rates through widespread distribution.

3.3 Sampling Techniques

To achieve a representative sample, a probability sampling technique is used. This technique is employed to ensure that each associate of the population has an equivalent chance of being included in the sample. Invitations to participate in the survey were distributed randomly within the defined population.

3.4 Data Collection

Data collection was carried out using an online survey created and distributed via Google Forms.

Survey Design: The survey included structured questions designed to capture quantitative data on the experiences and perceptions of AI integration in education.

Question Types: The survey featured multiple-choice questions.

Distribution Method: The survey link was distributed via social media platforms, ensuring broad reach across various tertiary institutions in Bangladesh.

Secondary Data: Secondary data was collected by collecting existing surveys available on internets and previous researches.

Data Security and Anonymity: Measures were taken to ensure the confidentiality and anonymity of respondents, with data securely stored and accessed only by the researcher.

3.5 Data Analysis

After collecting the primary data and secondary data related to this research, a comparative data analysis was performed between every primary data collection question and its available secondary data. This analysis compares the impact of AI in the tertiary level education in Bangladesh.

3.6 Conclusion

This chapter outlines the methodological framework for the study, detailing the systematic approach to sampling, data collection, and data analysis. By utilizing an online survey distributed via Google Forms, the study ensures a wide reach and efficient data collection process, providing a solid foundation for analyzing the impact of AI integration on tertiary education in Bangladesh.

CHAPTER 4

AI APPLICATIONS FOR TERTIARY LEVEL EDUCATION

4.1 Introduction

In recent years, the addition of artificial intelligence (AI) in tertiary education has opened up new avenues for enhancing the learning experience. This chapter explores various applications of AI within tertiary education institutions, highlighting their potential to revolutionize teaching and learning methodologies.

4.2 Personalized Learning Platforms

Personalized education platforms leverage AI algorithms to tailor educational content and experiences according to each student's individual needs and learning preferences. These platforms analyze student data, such as learning patterns and performance metrics, to deliver customized learning pathways, thereby optimizing student engagement and academic outcomes [13].

4.3 Intelligent Tutoring Systems

Intelligent tutoring systems (ITS) employ AI technologies to provide personalized and adaptive guidance to students. By simulating one-on-one tutoring experiences, ITS offer targeted support, feedback, and scaffolding to learners, helping them grasp complex concepts and overcome learning obstacles more effectively [14].

4.4 Chatbots for Student Support

Chatbots are AI-powered virtual assistants that can provide real-time support and assistance to students. Integrated into educational platforms and websites, these chatbots offer instant responses to queries related to course information, academic resources, administrative procedures, and more, enhancing student satisfaction and retention [15].

4.5 AI-powered Assessment Tools

AI-powered assessment tools automate and streamline the process of evaluating student performance. By leveraging machine learning algorithms, these tools can analyze and

interpret various forms of student work, including essays, projects, and exams, providing timely feedback and insights to both students and educators. [16].

4.6 Virtual Reality Learning Experiences

Virtual reality (VR) technologies create immersive learning experiences that enable students to explore and interact with complex concepts in a simulated environment. AI algorithms enhance VR applications by personalizing content and adapting simulations based on real-time student interactions, fostering deeper engagement and comprehension. [17].

4.7 Conclusion

The integration of AI in tertiary education offers immense potential to transform teaching and learning practices, making education more personalized, accessible, and effective. By harnessing the power of AI-driven technologies, institutions can cater to diverse student needs, enhance academic outcomes, and prepare learners for success in an increasingly digital and interconnected world.

CHAPTER 5

DATA ANALYSIS AND INTERPRETATION OF THE FINDINGS

5.1 Introduction

This chapter outlines the analysis of the primary and secondary data for this thesis. I gather the primary data using an online survey consisting of twelve multiple-choice questions and distribute the survey link to various tertiary-level students via social media platforms. I gather the secondary data from multiple online sources and surveys conducted by international organizations. After collecting these data, I performed a comparative analysis.

5.2 Data Analysis Tools

For analyzing the survey data collected on the impact of Artificial Intelligence (AI) on tertiary-level education in Bangladesh, the following tools and libraries were utilized:

Python: Python was used as the primary programming language due to its extensive libraries for data manipulation, analysis, and visualization.

Pandas: Pandas is a powerful Python library used for data manipulation and analysis. It provides data structures and functions needed to clean, analyze, and visualize data efficiently.

In this study, Pandas was used to load the CSV file, clean the data, and perform grouping and summarization tasks.

Matplotlib: Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python.

This tool was employed to generate pie charts that visually represent the percentage distribution of responses for each survey question.

Jupyter Notebook: Jupyter Notebook is an open-source web application that lets you to generate and share credentials containing live code, equations, visualizations, and narrative

text. It is extensively used for data cleaning, transformation, visualization, and even machine learning. For this project, Jupyter Notebook was used to perform the data loading and cleaning, data grouping and summarization, data visualization, documentation and analysis

5.3 Algorithm for Data Analysis

The data analysis process for this research was carried out using the following algorithm:

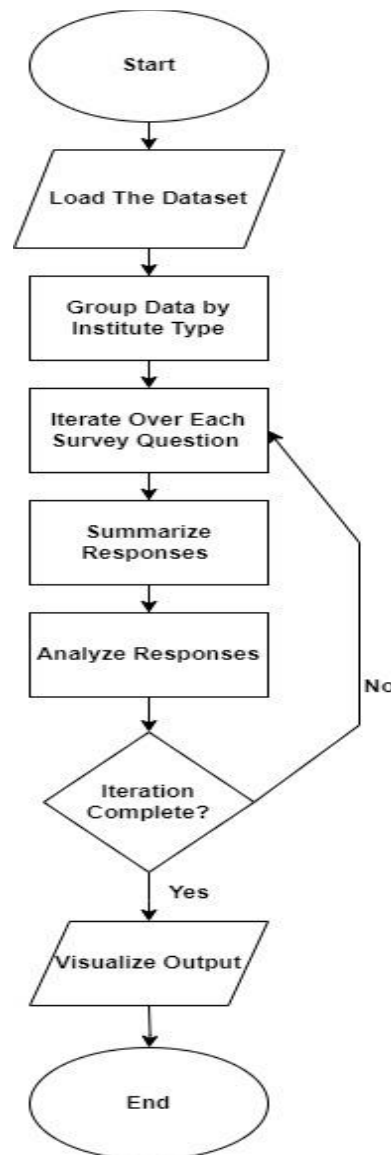


Figure 5.3.1 Algorithm Flowchart

1. **Load the CSV File:** The dataset was loaded from a CSV file into a Pandas Data Frame to facilitate data manipulation and analysis.
2. **Data Cleaning:** The data was cleaned by handling any missing values and ensuring consistency across the dataset.
3. **Group by 'Type of Educational Institute':** The data was grouped based on the type of educational institution to understand how responses varied across different types of institutions.
4. **Iterate Over Each Survey Question:**

For each survey question, the following steps were performed:

- The count of each response option was computed, grouped by the type of educational institution
 - The grouped data was reshaped into a summary table for better readability and analysis.
 - The summary table was stored in a dictionary for later use.
 - A pie chart was created to visualize the percentage distribution of responses for each question.
5. **Print Summary Tables:** The summary tables were printed to provide a clear overview of the responses for each survey question.
 6. **Visualize with Pie Charts:** Pie charts were generated to graphically represent the distribution of responses for each survey question, making it easier to interpret the data.

5.4 Key Functions and Methods Used

The following key functions and methods from the Pandas and Matplotlib libraries were used to analyze and visualize the survey data:

1. Loading Data:

pd.read_csv(file_path) : This function loads the CSV file located at file_path into a Pandas DataFrame. It is essential for importing the data into a format suitable for analysis.

2. Grouping Data:

data.groupby('What type of educational institute do you belong to?') : This method groups the data by the specified column ('Type of Educational Institute'). Grouping is useful for aggregating data based on different categories, allowing for comparative analysis.

3. Summarizing Data:

.value_counts().unstack().fillna(0) : This chain of methods is used to count the occurrences of each response, reshape the data into a more readable format, and fill any missing values with zero. It converts the grouped data into summary tables.

4. Iterating Over Columns:

for col in data.columns[1:-1] : This loop iterates over each column in the DataFrame (excluding the first and last columns) to perform operations on each survey question. It ensures that each question is analyzed separately.

5. Calculating Percentages:

data[question].value_counts(normalize=True) * 100: This method calculates the percentage of each response for a given question. The `normalize=True` parameter converts counts into proportions, and multiplying by 100 gives the percentage.

6. Plotting Pie Charts:

plt.pie(): This function from the Matplotlib library is used to create pie charts. It takes the percentages of responses and labels them, providing a visual representation of the data distribution.

plt.show(): This function displays the plotted pie chart. It is used to render the chart after plotting.

5.5 Primary Data Analysis

For this research, I collected primary data through the questionnaires below:

1. How familiar are you with the concept of Artificial Intelligence (AI) in education?
2. Do you think AI can be beneficial for tertiary-level education in Bangladesh?
3. Have you ever used AI-powered tools or technologies in education?
4. Do you think studying with ChatGPT is better than using a tutor?
5. Do you think AI has improved your grades?
6. Do you believe AI integration enhances the learning experience?
7. Do you believe that AI integration makes the education system more effective and efficient?
8. Do you regularly use AI chatbots for educational purposes?
9. Do you feel guilty for using AI for completing assignments?
10. Do you believe stricter regulations are needed for the use of such tools in Bangladeshi universities?
11. How satisfied are you with the current level of technology integration in your university's educational practices?
12. Do you think that AI will impact your future career?

787 responders from different types of tertiary level institutes responded to this survey.

Private University: 364

Public University: 224

National University: 151

Others: 48

Proportional Breakdown:

Private University: $(364/787) \times 100 \approx 46.3 \%$

Public University: $(224/787) \times 100 \approx 28.5 \%$

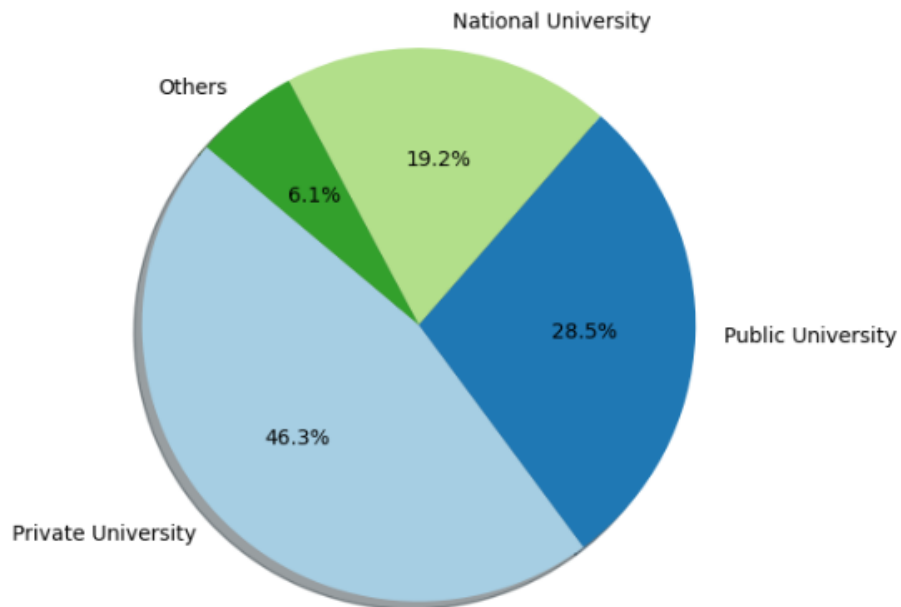
National University: $(151/787) \times 100 \approx 19.2 \%$

Others: $(48/787) \times 100 \approx 6.1 \%$

(This proportional breakdown style is followed for the rest of the analysis)

The percentage of this responses illustrated in Fig. 5.5.1

Percentage of responses for "What type of educational institute do you belong to?"



5.5. 1 Responders Ratio.

Nearly half of the respondents (46.25%) are from private universities. This high representation suggests that private universities are more engaged or impacted by the integration of AI in tertiary education. Private universities often have more flexible administrative structures, greater access to funding, and a proactive approach to adopting new technologies.

Public universities account for 28.46% of the respondents, indicating substantial interest and involvement in AI integration. While they may benefit from government support and larger student bodies, public universities could face bureaucratic challenges and slower adoption rates compared to private institutions.

National universities make up 19.18% of the respondents, reflecting their role in the education landscape. These institutions may focus on specific academic programs where AI can be particularly beneficial.

The "Others" category includes 6.10% of the respondents. This group likely comprises various educational institutions such as vocational institutes, Polytechnical institutes. These institutions might have limited resources and infrastructure for AI integration.

Now analyzing the tertiary level students' responses for all the questions from the survey:

-

Question 1: How familiar are you with the concept of Artificial Intelligence (AI) in education?

Very Familiar: 36

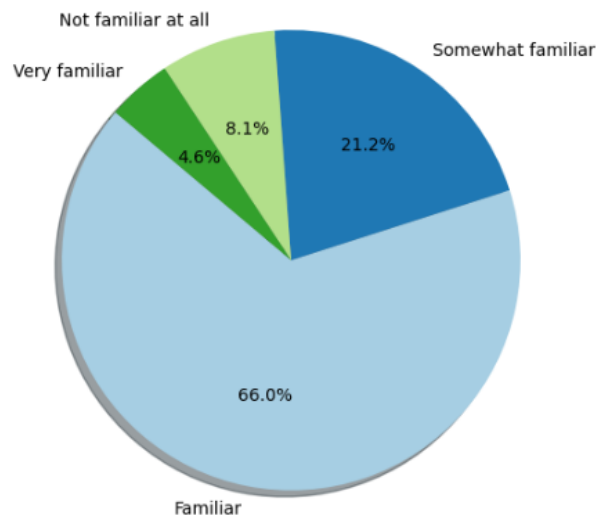
Familiar: 519

Somewhat Familiar: 167

Not Familiar at all: 64

The percentage of this responses illustrated in Fig. 5.5.2.

Percentage of responses for "How familiar are you with the concept of Artificial Intelligence (AI) in education?"



5.5. 2 Familiarity with AI in Education.

The survey results indicate varying levels of familiarity with AI in education among respondents. A small but significant group (4.6%) is very familiar with AI, likely comprising experts who can lead AI initiatives. The majority (66.0%) are familiar and show substantial awareness, suggesting openness to integrating AI into educational practices. Meanwhile, 21.2% are somewhat familiar, representing a segment that could benefit from further training and practical examples to enhance their understanding. Finally, 8.1% are not familiar at all, highlighting the need for foundational education and awareness-raising efforts to bring them up to speed.

Question 2: Do you think AI can be beneficial for tertiary-level education in Bangladesh?

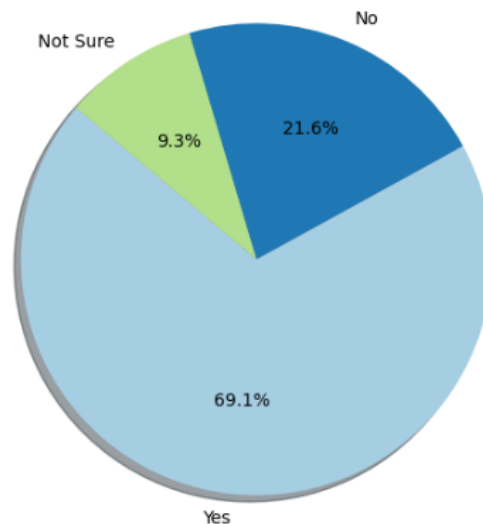
Yes: 543

No: 170

Not Sure: 73

The percentage of this responses illustrated in Fig. 5.5.3.

Percentage of responses for "Do you think AI can be beneficial for tertiary-level education in Bangladesh?"



5.5. 3 Respondents' Opinions on the Benefits of AI for Tertiary-Level Education in Bangladesh

Approximately 69.1% of respondents believe that AI can be beneficial for tertiary-level education in Bangladesh. This suggests a strong majority sees the potential for AI to enhance educational outcomes, improve administrative efficiency, and provide personalized learning experiences.

Around 21.6% of respondents do not believe that AI can be beneficial for tertiary education. This significant minority may have concerns about various issues such as implementation challenges, cost, potential job displacement, ethical concerns, or a lack of infrastructure.

About 9.3% of respondents are unsure about the benefits of AI in tertiary education. This group likely needs more information, clearer examples, or evidence of successful AI implementations in educational settings to form a solid opinion.

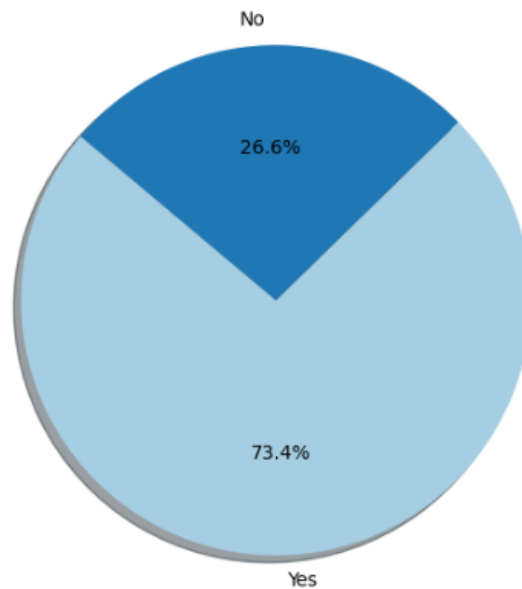
Question 3: Have you ever used AI-powered tools or technologies in education?

Yes: 577

No: 209

The percentage of this responses illustrated in Fig. 5.5.4.

Percentage of responses for "Have you ever used AI-powered tools or technologies in education?"



5.5. 4 Adoption of AI-Powered Tools or Technologies in Education

Around 73.4% of respondents have used AI-powered tools or technologies in education. This majority suggests a widespread adoption of AI in educational settings, indicating its perceived value and effectiveness in enhancing teaching and learning experiences.

Approximately 26.6% of respondents have not used AI-powered tools or technologies in education. This minority might indicate various factors such as limited access to AI resources, personal preferences for traditional teaching methods, or a lack of awareness about available AI tools.

Question 4: Do you think studying with ChatGPT is better than using a tutor?

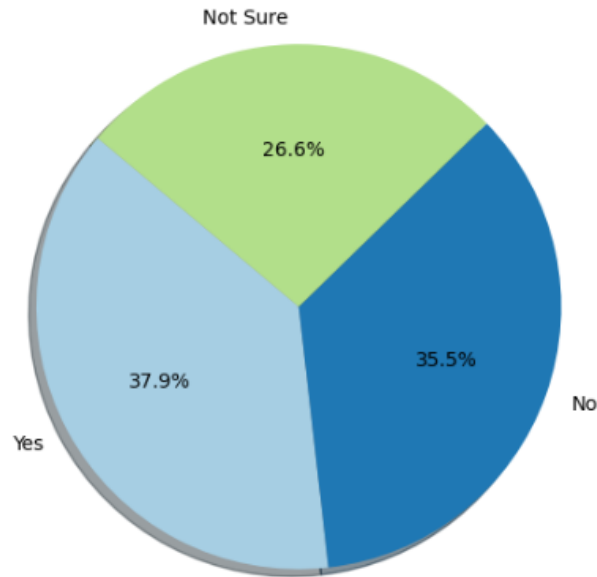
Yes: 298

No: 279

Not Sure: 209

The percentage of this responses illustrated in Fig. 5.5.5.

Percentage of responses for "Do you think studying with ChatGPT is better than using a tutor?"



5.5. 5 Comparison of Preferences Between Studying with ChatGPT and Using a Tutor

Approximately 37.9% of respondents believe that studying with ChatGPT is better than using a tutor. This suggests a significant portion of respondents see value in using AI-powered tools like ChatGPT for their learning needs, possibly due to factors such as accessibility, flexibility, and convenience.

Around 35.5% of respondents do not believe that studying with ChatGPT is better than using a tutor. This indicates a sizable group that prefers the personalized interaction and guidance provided by human tutors over AI-based learning tools.

Approximately 26.6% of respondents are not sure whether studying with ChatGPT is better than using a tutor. This suggests a level of uncertainty or indecision among respondents, possibly due to a lack of familiarity with AI-based learning tools or a need for more information to make a judgment.

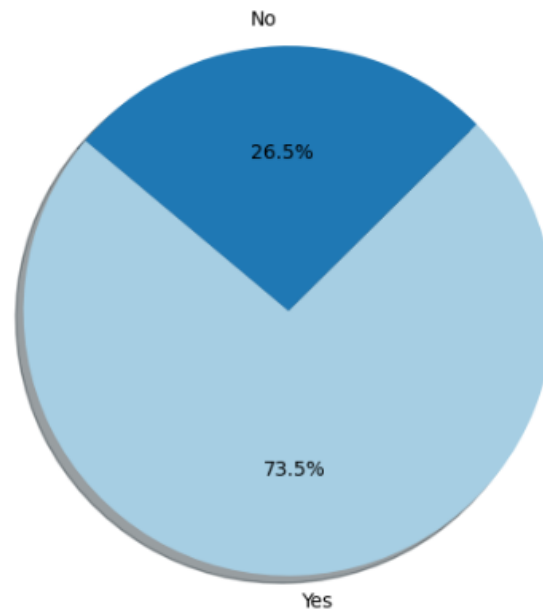
Question 5: Do you think AI has improved your grades?

Yes: 578

No: 208

The percentage of this responses illustrated in Fig. 5.5.6.

Percentage of responses for "Do you think AI has improved your grades?"



5.5. 6 Perception of AI's Effectiveness in Improving Grades

Approximately 73.6% of respondents believe that AI has improved their grades. This suggests a significant majority of individuals perceive AI as positively influencing their academic performance, possibly through various means such as personalized learning, access to educational resources, or assistance with assignments and studying.

Around 26.4% of respondents do not believe that AI has improved their grades. This indicates a notable minority who either haven't experienced positive effects from AI usage on their academic performance or perceive AI's impact as neutral or negative.

The majority of respondents (73.6%) believe that AI has improved their grades, suggesting a widespread perception of the positive impact of AI on academic performance. However,

there is also a notable minority (26.4%) who do not perceive AI as positively influencing their grades. This highlights the need for continued research and development to optimize AI-driven educational tools and ensure they effectively support diverse learning needs and preferences.

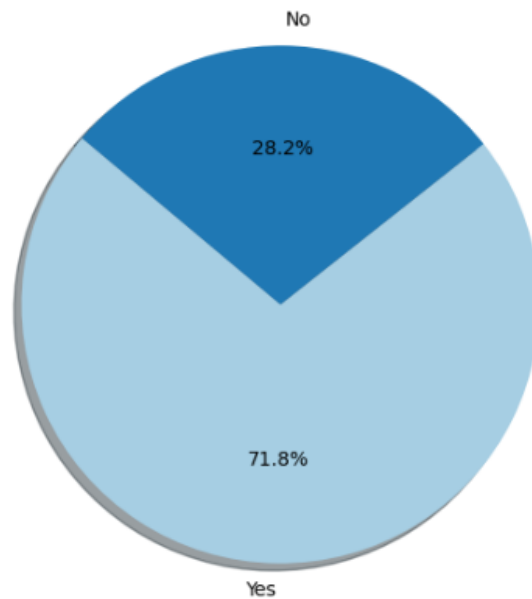
Question 6: Do you believe AI integration enhances the learning experience?

Yes: 564

No: 222

The percentage of this responses illustrated in Fig. 5.5.7.

Percentage of responses for "Do you believe AI integration enhances the learning experience?"



5.5. 7 Perception of AI Integration's Impact on Learning Experience

Approximately 71.8% of respondents believe that AI integration enhances the learning experience. This signifies a substantial majority endorsing the notion that incorporating AI technologies into education can enrich and improve the learning process.

Around 28.2% of respondents do not believe that AI integration enhances the learning experience. This constitutes a significant minority expressing skepticism or reservations about the effectiveness of AI in improving learning outcomes.

Question 7: Do you believe that AI integration makes the education system more effective and efficient?

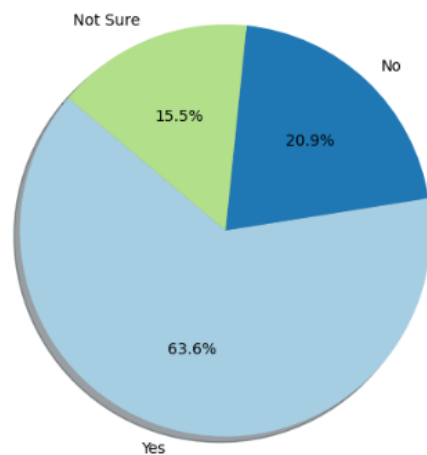
Yes: 500

No: 164

Not Sure: 122

The percentage of this responses illustrated in Fig. 5.5.8.

Percentage of responses for "Do you believe that AI integration makes the education system more effective and efficient?"



5.5. 8 Beliefs Regarding AI's Influence on Education System Effectiveness and Efficiency

Approximately 63.6% of respondents believe that AI integration makes the education system more effective and efficient. This signifies a significant majority endorsing the idea that incorporating AI technologies into education can enhance its effectiveness and efficiency.

Around 20.9% of respondents do not believe that AI integration makes the education system more effective and efficient. This constitutes a notable minority expressing skepticism or disagreement regarding the impact of AI integration on educational effectiveness and efficiency.

Approximately 15.5% of respondents are not sure whether AI integration makes the education system more effective and efficient. This suggests a level of uncertainty or indecision among respondents, possibly due to a lack of information or experience with AI in education.

Question 8: Do you regularly use AI chatbots for educational purposes?

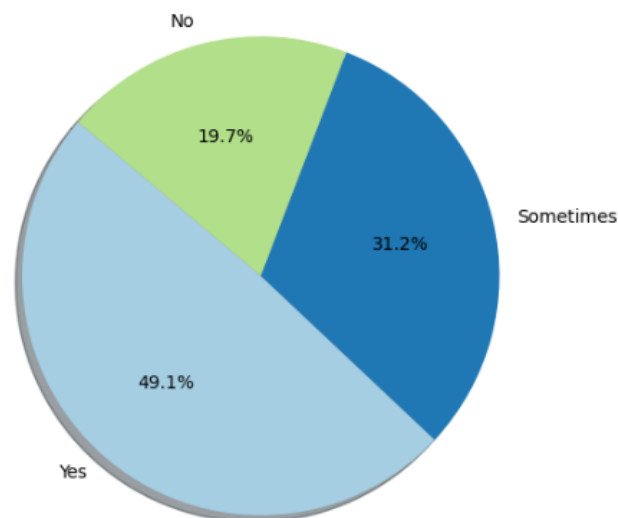
Yes: 386

No: 155

Sometimes: 245

The percentage of this responses illustrated in Fig. 5.5.9.

Percentage of responses for "Do you regularly use AI chatbots for educational purposes?"



5.5. 9 Usage Patterns of AI Chatbots for Educational Purposes

Approximately 49.1% of respondents regularly use AI chatbots for educational purposes. This indicates a significant portion of respondents who rely on AI chatbots as a consistent tool for their educational needs.

Around 19.7% of respondents do not use AI chatbots for educational purposes. This suggests a minority of respondents who either prefer alternative methods for learning or have limited exposure to AI chatbot technology.

Approximately 31.2% of respondents sometimes use AI chatbots for educational purposes. This indicates a sizable portion of respondents who use AI chatbots intermittently, possibly depending on specific learning tasks or contexts.

The data demonstrates diverse usage patterns of AI chatbots for educational purposes, with a significant portion of respondents regularly using them. While many find value in AI chatbots for their educational needs, there are also non-users and occasional users, indicating opportunities for further engagement and exploration of AI chatbot technology in education.

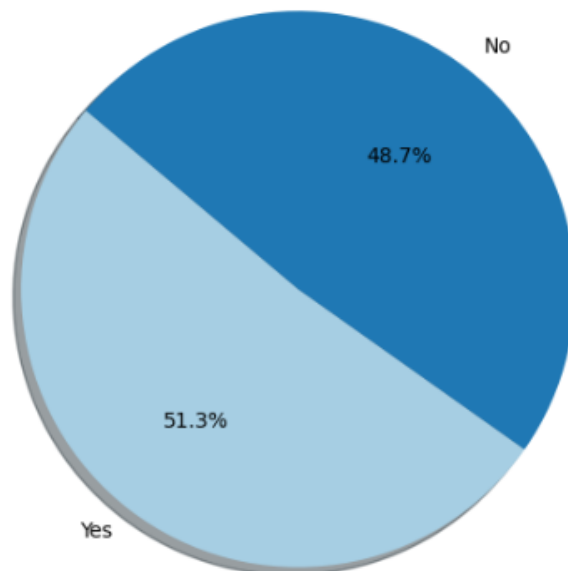
Question 9: Do you feel guilty for using AI for completing assignments?

Yes: 404

No: 383

The percentage of this responses illustrated in Fig. 5.5.10.

Percentage of responses for "Do you feel guilty for using AI for completing assignments?"



5.5. 10 Perspectives on Guilt Regarding AI Utilization in Academic Assignments

Approximately 51.3% of respondents feel guilty for using AI to complete assignments. This indicates that a slight majority experience feelings of guilt when utilizing AI for academic tasks. Approximately 51.3% of respondents feel guilty for using AI to complete assignments. This indicates that a slight majority experience feelings of guilt when utilizing AI for academic tasks.

Feelings of guilt may stem from various factors, including concerns about academic integrity, ethical considerations, or personal beliefs about the value of independent work. Those who do not feel guilty may view AI as a legitimate tool for enhancing productivity or as an acceptable means of support in the learning process.

Feelings of guilt may influence individuals' behavior and attitudes towards AI usage in the future. Those who feel guilty may be more inclined to seek alternative methods for completing assignments, while those who do not may continue to utilize AI as a valuable resource.

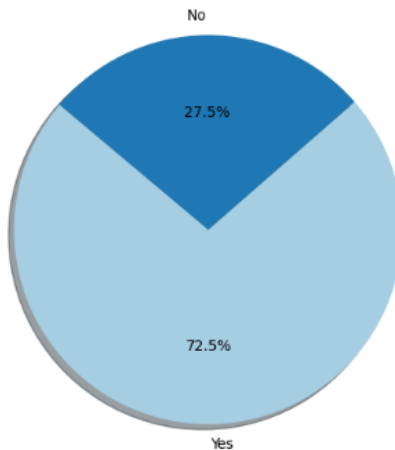
Question 10: Do you believe strict regulations are needed for the use of such tools in Bangladeshi universities?

Yes: 570

No: 216

The percentage of this responses illustrated in Fig. 5.5.11.

Percentage of responses for "Do you believe stricter regulations are needed for the use of such tools in Bangladeshi universities?"



5.5. 11 Perspectives on the Need for Strict Regulations on Tool Usage in Bangladeshi Universities.

Approximately 72.5% of respondents believe that strict regulations are needed for the use of such tools in Bangladeshi universities. This indicates a significant majority endorsing the idea of implementing strict guidelines or controls for the use of these tools.

Around 27.5% of respondents do not believe that strict regulations are needed for the use of such tools in Bangladeshi universities. This constitutes a notable minority expressing opposition to the implementation of stricter guidelines or controls.

The data indicates significant support for the implementation of stricter regulations for the use of such tools in Bangladeshi universities, with a clear majority of respondents endorsing this approach. However, there is also a notable minority expressing opposition to stricter regulations, highlighting the need for careful consideration of diverse

perspectives and balancing accountability with fostering innovation and progress in educational practices.

Question 11: How satisfied are you with the current level of technology integration in your university's educational practices?

Very Dissatisfied: 62

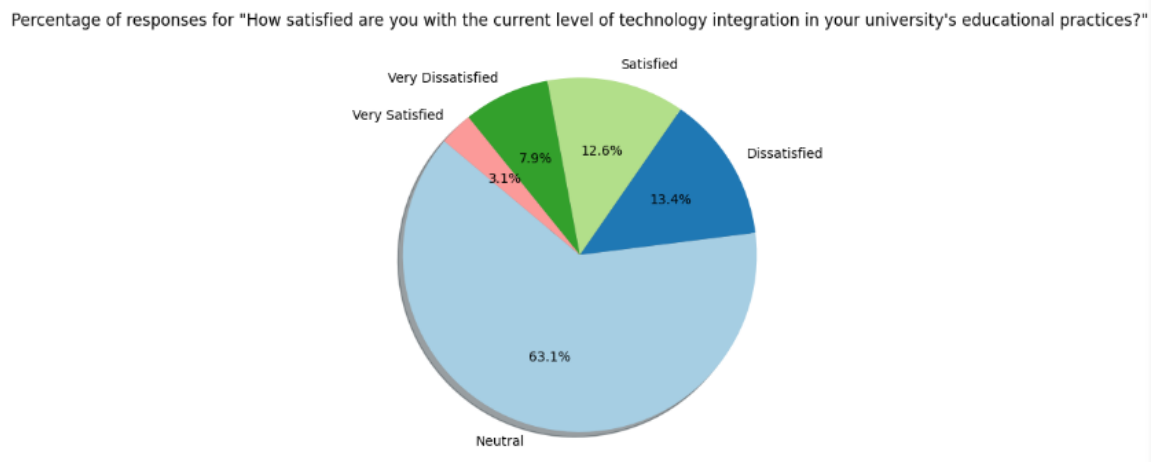
Dissatisfied: 105

Neutral: 496

Satisfied: 99

Very Satisfied: 24

The percentage of this responses illustrated in Fig. 5.5.12.



5.5. 12 Satisfaction Levels with Technology Integration in University Educational Practices

Approximately 21.3% of respondents express low satisfaction levels with the current level of technology integration in university educational practices. This indicates that a notable minority is dissatisfied or very dissatisfied with the extent to which technology is integrated into their educational experiences.

Around 63.1% of respondents hold a neutral perspective regarding the current level of technology integration. This suggests that a majority of respondents neither strongly approve nor disapprove of the existing state of technology integration in their university's educational practices.

Approximately 15.6% of respondents express high satisfaction levels with the current level of technology integration. This indicates that a smaller proportion of respondents are satisfied or very satisfied with the extent to which technology is integrated into their educational experiences.

Question 12: Do you think that AI will impact your future career?

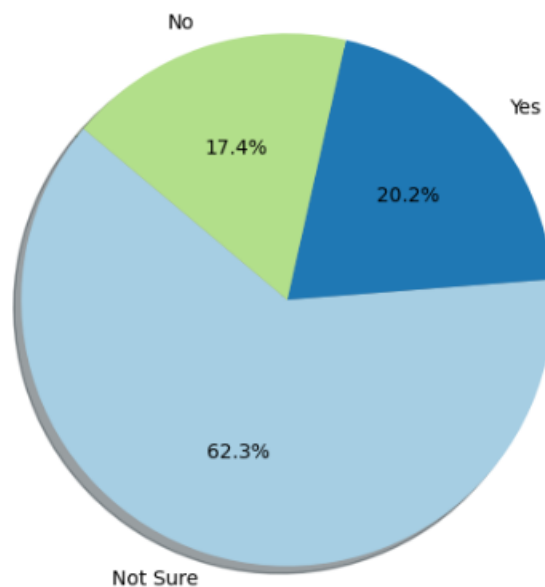
Yes: 159

No: 137

Not Sure: 490

The percentage of this responses illustrated in Fig. 5.5.13.

Percentage of responses for "Do you think that AI will impact your future career?"



5.5. 13 Perceptions of AI's Impact on Future Careers

Approximately 20.2% of respondents believe that AI will impact their future career. This suggests that a minority of respondents anticipate AI playing a significant role in shaping their professional paths.

Around 17.4% of respondents do not believe that AI will impact their future career. This indicates a smaller portion of respondents who perceive AI as having minimal influence on their career trajectory.

The majority of respondents, approximately 62.4%, are unsure about whether AI will impact their future career. This suggests a significant level of uncertainty or indecision among respondents regarding the potential impact of AI on their professional futures.

5.6 Secondary Data Analysis

I have collected available secondary data from global survey online which are related to my survey questions and primary data.

1. According to global student survey 2023, 40% of global students are familiar, 29% Somewhat familiar and 31% are not familiar with AI in education. (Source: Chegg)
2. 50% of global students used AI powered tools or technology in Education. (Source: Chegg)
3. 41% of global students think studying with ChatGPT is better than using a tutor. On the other hand, 51% global students think their teacher or professor knows better how to teach online. (Source: Chegg)
4. 68% of global students believe that AI has improved their grades. (Source: CryptoPolitan)
5. 53% of global students believe that AI integration enhances their learning experience. (Source: Chegg)

6. 47% of global students believe that AI integration makes the education system more effective and efficient. (Source : PR Newswire).
7. 50 % of global students regularly use AI chatbots for educational purposes. (Source: Chegg)
8. 38% of UK students feel guilty about using AI. (Source: Cryptopolitan)
9. 35% of global students are satisfied with the current level of technology integration in their university's educational practices. (Source: Chegg)
10. 65 % of global students think that AI will impact their future career. (Source: Chegg)

5.7 Comparative Analysis of Primary and Secondary Data

Now conducting a comparative analysis of the primary data I've collected and the secondary data from various global sources:

Familiarity with AI in Education: In Bangladesh, there is a significantly higher percentage of students (66%) who are familiar with AI compared to the global average (40%).

A smaller percentage of Bangladeshi students (8.1%) are not familiar with AI compared to the global average (31%).

Bangladeshi students show a higher level of familiarity with AI in education compared to the global average.

Usage of AI-Powered Tools or Technologies in Education: A significantly higher percentage of Bangladeshi students (73.4%) have used AI-powered tools in education compared to the global average (50%).

Studying with ChatGPT vs. Tutor: Similar percentages of Bangladeshi students (37.9%) and global students (41%) think studying with ChatGPT is better than using a tutor.

However, a larger percentage of global students (51%) believe their teacher or professor knows better how to teach online, highlighting a preference for traditional teaching methods.

Impact of AI on Grades: A higher percentage of Bangladeshi students (73.5%) believe that AI has improved their grades compared to the global average (68%).

AI Enhancing the Learning Experience: A significantly higher percentage of Bangladeshi students (71.8%) believe that AI enhances their learning experience compared to the global average (53%).

AI Making the Education System More Effective and Efficient: A larger percentage of Bangladeshi students (63.6%) believe that AI makes the education system more effective and efficient compared to the global average (47%).

Regular Use of AI Chatbots for Educational Purposes: The percentage of Bangladeshi students who regularly use AI chatbots (49.1%) is nearly equal to the global average (50%).

Feelings of Guilt About Using AI: A higher percentage of Bangladeshi students (51.3%) feel guilty about using AI compared to the percentage of UK students (38%).

Satisfaction with Technology Integration in University: A smaller percentage of Bangladeshi students (15.7%) are satisfied or very satisfied with the current level of technology integration compared to the global average (35%).

Impact of AI on Future Careers: A significantly smaller percentage of Bangladeshi students (20.2%) believe that AI will impact their future career compared to the global average (65%).

A large proportion of Bangladeshi students (62.4%) are unsure about AI's impact on their future career, indicating uncertainty or lack of information.

5.8 Conclusion

Bangladeshi students show higher familiarity and usage rates of AI in education compared to the global averages. They have more positive perceptions about AI's impact on grades and learning experiences.

However, they express higher levels of uncertainty regarding AI's impact on future careers and feel more guilt about using AI for assignments. Satisfaction with current technology integration in universities is lower among Bangladeshi students compared to global averages, indicating potential areas for improvement.

CHAPTER 6

PREDICTING PERCEIVED BENEFITS OF AI IN TERTIARY LEVEL EDUCATION USING MACHINE LEARNING APPROACH

6.1 Introduction

Artificial Intelligence is increasingly becoming integral to various sectors, including education. As educational institutions explore AI's potential, understanding its perceived benefits among students is crucial. This chapter delves into using machine learning to predict students' perceptions of AI's benefits in tertiary education. By analyzing survey data on students' familiarity and experiences with AI, I aim to identify key factors that influence their belief in AI's potential for enhancing educational practices. Employing a Decision Tree Classifier, we can uncover patterns in student responses, providing valuable insights into the anticipated impact of AI on higher education in Bangladesh.

6.2 Algorithm for Predicting Perceived Benefits of AI in Tertiary Level Education

1. Load and Preprocess Data:

- Load the CSV file into a DataFrame.
- Convert categorical columns to numerical codes for model training.
- Select features and the target variable for prediction.

2. Split the Data:

- Divide the data into training and testing sets.

3. Train the Model:

- Initialize and train a Decision Tree Classifier using the training data.

4. Make Predictions:

- Use the trained model to predict the target variable on the test data.

5. Evaluate the Model:

- Generate and analyze the confusion matrix and classification report to evaluate the model's performance.

6. Analyze Feature Importance:

- Calculate and plot the importance of each feature in making predictions.

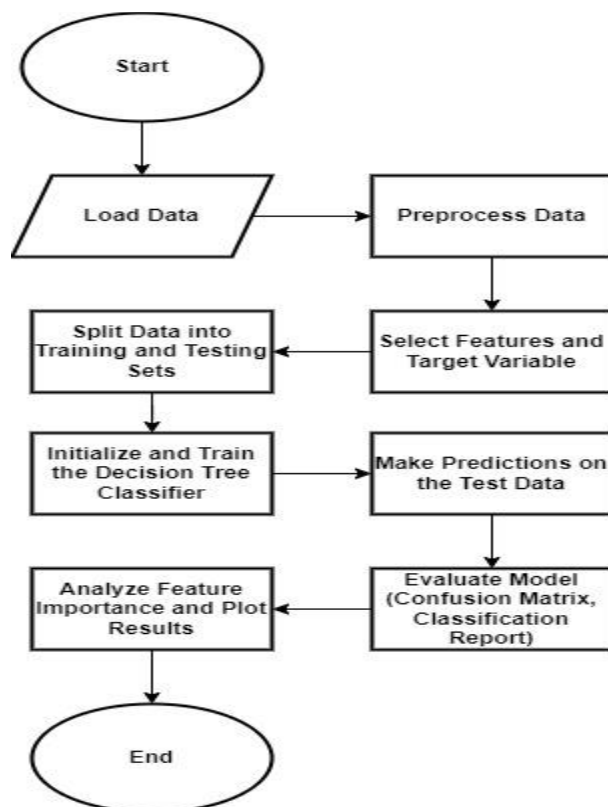


Figure 6.2.1 Algorithm for Predicting Perceived Benefits of AI in Tertiary Level Education

6.3 Key Functions and Methods Used

In this machine learning workflow for predicting whether students believe AI will impact their future careers, several key functions and methods were employed. Here's a detailed breakdown of the most important ones:

1. `pandas.read_csv()`

- **Purpose:** Reads a comma-separated values (CSV) file into a pandas DataFrame.
- **Usage:**

```
data = pd.read_csv(file_path)
```

- **Explanation:** This function is used to load the survey data from a CSV file into a structured format (DataFrame) suitable for analysis.

2. `astype('category').cat.codes`

- **Purpose:** Converts categorical data to numerical codes.
- **Usage:**

```
data['Institution_Type'] = data['What type of educational institute do you belong to?'].astype('category').cat.codes
```

- **Explanation:** This method changes categorical text data into numerical codes, which are required for most machine learning algorithms. It simplifies and speeds up the processing by the model.

3. `train_test_split()`

- **Purpose:** Splits the dataset into training and testing sets.
- **Usage:**

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)
```

- **Explanation:** This function from `sklearn.model_selection` is used to divide the data into two parts: one for training the model and one for evaluating its

performance. `test_size=0.3` indicates that 30% of the data is used for testing, and `random_state=42` ensures reproducibility.

4. `DecisionTreeClassifier()`

- **Purpose:** Initializes a decision tree classifier.
- **Usage:**

```
dt_model = DecisionTreeClassifier(random_state=42)
```

- **Explanation:** This function from `sklearn.tree` creates an instance of a Decision Tree Classifier, which is a popular machine learning model for classification tasks. Setting `random_state=42` ensures consistent results across different runs.

5. `fit()`

- **Purpose:** Trains the model using the training data.
- **Usage:**

```
dt_model.fit(X_train, y_train)
```

- **Explanation:** This method fits the model to the training data (`X_train` and `y_train`), enabling it to learn patterns from the input features and corresponding target values.

6. `predict()`

- **Purpose:** Makes predictions on new data.
- **Usage:**

```
y_pred = dt_model.predict(X_test)
```

- **Explanation:** After training, this method is used to predict the target variable for the test data (`X_test`). It outputs the model's predictions, which are then compared with the actual values to assess performance.

7. confusion_matrix()

- **Purpose:** Generates a confusion matrix to evaluate model performance.
- **Explanation:** This function from sklearn.metrics provides a summary of prediction results, showing the number of correct and incorrect predictions for each class. It helps in understanding how well the model differentiates between the classes.

8. classification_report()

- **Purpose:** Generates a detailed classification report.
- **Usage:**

```
print("\nClassification Report:\n", classification_report(y_test, y_pred))
```

- **Explanation:** This function from sklearn.metrics provides precision, recall, and F1-score for each class. These metrics give a comprehensive view of the model's performance across all classes.

9. feature_importances_

- **Purpose:** Accesses the importance of each feature used in the model.
- **Explanation:** This attribute of the trained Decision Tree model provides the relative importance of each feature in making predictions. Higher values indicate more significant features.

10. sns.barplot()

- **Purpose:** Creates a bar plot to visualize feature importance.
- **Usage:**

```
sns.barplot(x=feature_importances.index, y=feature_importances['importance'])
```

- **Explanation:** This function from the seaborn library creates a bar plot to display the importance of each feature. It helps visually interpret which features are most influential in the prediction process.

6.4 Confusion Matrix and Classification Report

```
Confusion Matrix:
[[ 37   3  11]
 [  6   6   7]
 [  6   2 159]]

Classification Report:
              precision    recall  f1-score   support

     0       0.76       0.73       0.74       51
     1       0.55       0.32       0.40       19
     2       0.90       0.95       0.92      167

 accuracy          0.85       237
 macro avg       0.73       0.66       0.69       237
 weighted avg    0.84       0.85       0.84       237
```

Figure 6.4.1 Confusion Matrix and Classification Report

The confusion matrix delivers a cessation of the model's predictions associated to the actual class labels. Each row of the matrix signifies the instances in an actual class, while each column represents the cases in a predicted class.

- **Class 0** (Not beneficial): Out of 51 students who believe AI is not beneficial, 37 were correctly predicted, while 14 were misclassified (3 as class 1 and 11 as class 2).
- **Class 1** (Not sure): Out of 19 students who are unsure, only 6 were correctly predicted, with 13 misclassified (6 as class 0 and 7 as class 2).
- **Class 2** (Beneficial): Out of 167 students who believe AI is beneficial, 159 were correctly predicted, while 8 were misclassified (6 as class 0 and 2 as class 1).

The classification report summarizes key metrics for evaluating the performance of the classification model: precision, recall, and F1-score for each class.

- **Precision:** The proportion of true positive predictions among all positive predictions for a class. High precision indicates fewer false positives.
- **Recall:** The proportion of true positive predictions among all actual instances of the class. High recall indicates fewer false negatives.
- **F1-Score:** The harmonic mean of precision and recall. A high F1-score indicates a good balance between precision and recall.
- **Class 0 (Not beneficial):** The model has a precision of 0.76 and recall of 0.73, indicating that it correctly identifies 76% of the instances it predicts as not beneficial, and it captures 73% of all actual not beneficial instances.
- **Class 1 (Not sure):** This class has lower precision (0.55) and recall (0.32), showing the model struggles more with correctly identifying unsure students.
- **Class 2 (Beneficial):** The model performs best for this class, with a high precision (0.90) and recall (0.95), indicating it accurately identifies students who perceive AI as beneficial.
- **Accuracy:** The overall accuracy of the model is 85%, meaning it correctly predicts the perceived benefits of AI for 85% of the students.
- **Macro Average:** This average considers each class equally, providing an overall measure of the model's performance.
- **Weighted Average:** This average accounts for the number of instances in each class, offering a balanced performance measure considering class imbalances.

The model performs exceptionally well in predicting students who view AI as beneficial, reflecting strong understanding and clear patterns in this category.

6.5 Analysis of Feature Importances

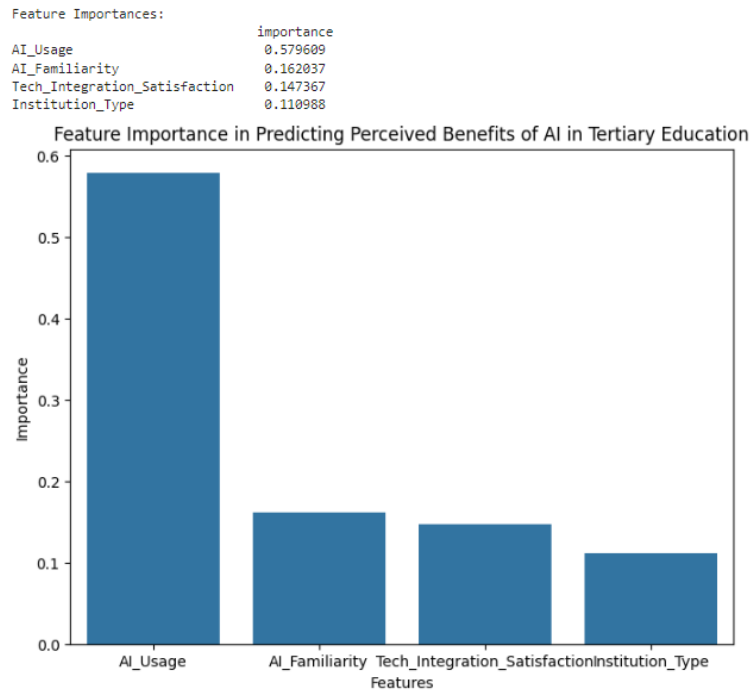


Figure 6.5.1 Feature Importances

AI Usage (Importance: 0.579609)

Significance: AI Usage is the most influential feature, indicating that students' current use of AI-powered tools or technologies in education heavily impacts their perception of AI's benefits.

Implication: This suggests that familiarity with practical applications of AI likely increases students' appreciation of its benefits in educational settings.

AI Familiarity (Importance: 0.162037)

Significance: AI Familiarity is the second most important feature, implying that general awareness and understanding of AI concepts play a significant role in shaping students' perceptions.

Implication: Educational programs that improve AI literacy could enhance positive perceptions of AI's role in education.

Tech Integration Satisfaction (Importance: 0.147367)

Significance: Satisfaction with the current level of technology integration in educational practices is also a crucial factor.

Implication: Students satisfied with their institution's technology adoption are more likely to view AI as beneficial, indicating a link between general tech satisfaction and AI perceptions.

Institution Type (Importance: 0.110988)

Significance: The type of educational institution students belongs to has the least impact among the features but still contributes to their perception of AI benefits.

Implication: Different educational settings may offer varying levels of exposure and resources related to AI, influencing students' views.

6.6 Conclusion

The analysis of student survey data to predict perceived benefits of AI in tertiary education reveals several key insights. Using a Decision Tree Classifier, the study identified that students' current usage of AI tools significantly influences their perception of AI's benefits. This suggests that practical, hands-on experiences with AI technologies are crucial in shaping positive views.

Moreover, familiarity with AI concepts also plays a substantial role, indicating that increasing AI literacy can enhance students' appreciation of AI's potential. Additionally, satisfaction with the level of technology integration in their institutions contributes to a favorable outlook towards AI, highlighting the importance of modernizing educational practices.

CHAPTER 7

RESULT AND DISCUSSION

7.1 Introduction

The Results and Discussion chapter presents and interprets the findings from the primary data collected through surveys of Bangladeshi students regarding their experiences and

perceptions of AI in education. This chapter also integrates secondary data from global studies to provide a comparative perspective. The objective is to understand the level of familiarity, usage, and impact of AI tools among students, and to explore how these factors influence educational outcomes in Bangladesh. Through detailed analysis and discussion, this chapter aims to highlight the current state of AI integration in education, its benefits, challenges, and potential future implications.

7.2 Results and Discussion

In this Result and discussion section, firstly presenting the comparative data in table then discussing the result.

Familiarity with AI in Education

Table 6.2.1 Familiarity with AI in Education

Familiarity Level	Bangladesh (%)	Global (%)
Very Familiar	4.6	-
Familiar	66.0	40
Somewhat Familiar	21.2	29
Not Familiar at All	8.1	31

Discussion

The primary data indicates a high level of familiarity with AI among students in Bangladesh, with 66.0% of respondents identifying as familiar and only 8.1% not familiar at all. In contrast, the global data shows that only 40% of students are familiar with AI, while a significant 31% are not familiar. This suggests that AI awareness campaigns or educational programs in Bangladesh may have been more effective compared to the global average. However, the smaller percentage of students being very familiar (4.6%) indicates room for deeper, more specialized knowledge dissemination.

Usage of AI-Powered Tools in Education

Table 6.2.2 Usage of AI-Powered Tools in Education

Usage	Bangladesh (%)	Global (%)
Yes	73.4	50
No	26.6	50

Discussion

A substantial majority (73.4%) of Bangladeshi students have used AI-powered tools in education, significantly higher than the global average of 50%. This high usage rate reflects a strong adoption of AI technologies within the educational framework in Bangladesh. It suggests a potential competitive edge for Bangladeshi students in adapting to AI-driven educational tools, which could enhance learning outcomes and digital literacy.

Studying with ChatGPT vs. Tutor

Table 6.2.3 Studying with ChatGPT vs. Tutor

Preference	Bangladesh (%)	Global (%)
Yes	37.9	49
No	35.5	-
Teacher Knows Better	-	51
Not Sure	26.6	-

Discussion

The preference for studying with ChatGPT is relatively similar between Bangladeshi students (37.9%) and the global average (49%). However, a significant number of global students (51%) prefer traditional tutoring methods compared to 35.5% in Bangladesh. This indicates a more balanced view in Bangladesh regarding the efficacy of AI tutoring versus human tutors. The substantial proportion of students who are unsure (26.6%) highlights the need for further research and education on the comparative benefits of AI tools and traditional methods.

Impact of AI on Grades

Table 6.2.4 Impact of AI on Grades

Impact	Bangladesh (%)	Global (%)
Yes	73.5	68
No	26.5	32

Discussion

A higher percentage of Bangladeshi students (73.5%) believe that AI has improved their grades compared to the global average (68%). This positive perception suggests that AI tools may be particularly effective in enhancing academic performance in Bangladesh, potentially due to better implementation or higher levels of engagement with these technologies.

AI Enhancing the Learning Experience

Table 6.2.5 AI Enhancing the Learning Experience

Opinion	Bangladesh (%)	Global (%)
Yes	71.8	53
No	28.2	47

Discussion

Bangladeshi students (71.8%) are more likely to believe that AI enhances their learning experience compared to the global average (53%). This significant difference underscores the potential benefits and acceptance of AI in the Bangladeshi education system. The positive feedback may encourage further integration of AI technologies to enhance educational practices.

AI Making the Education System More Effective and Efficient

Table 6.2.6 AI Making the Education System More Effective and Efficient

Opinion	Bangladesh (%)	Global (%)
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Yes	63.6	47
No	20.9	53
Not Sure	15.5	-

Discussion

A higher percentage of Bangladeshi students (63.6%) believe that AI makes the education system more effective and efficient compared to the global average (47%). This optimistic view reflects a strong belief in the transformative potential of AI to streamline educational processes and improve outcomes. However, a considerable number of students (20.9%) still express doubts, indicating areas where AI integration could be improved or better communicated.

Regular Use of AI Chatbots for Educational Purposes

Table 6.2.7 Regular Use of AI Chatbots for Educational Purposes

Frequency	Bangladesh (%)	Global (%)
Yes	49.1	50
No	19.7	50
Sometimes	31.2	-

Discussion

The usage of AI chatbots among Bangladeshi students (49.1% regularly, 31.2% sometimes) is comparable to the global average (50%). This parity suggests that Bangladeshi students are equally leveraging AI chatbots for educational support, indicating the widespread acceptance and utility of these tools in both contexts.

Feelings of Guilt About Using AI for Assignments

Table 6.2.8 Feelings of Guilt About Using AI for Assignments

Opinion	Bangladesh (%)	UK (%)
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Yes	51.3	38
No	48.7	62

Discussion

More Bangladeshi students (51.3%) feel guilty about using AI for completing assignments compared to UK students (38%). This higher level of guilt may be attributed to cultural factors, ethical considerations, or concerns about academic integrity. Addressing these feelings through clear guidelines and ethical usage policies can help mitigate guilt and promote responsible AI use.

Satisfaction with Technology Integration in University

Table 6.2.9 Satisfaction with Technology Integration in University

Satisfaction Level	Bangladesh (%)	Global (%)
Very Dissatisfied	7.9	-
Dissatisfied	13.4	-
Neutral	63.1	-
Satisfied	12.6	35
Very Satisfied	3.1	-

Discussion

A smaller percentage of Bangladeshi students (15.7% satisfied or very satisfied) are content with the current level of technology integration compared to the global average (35%). This indicates potential gaps in the technological infrastructure or implementation within Bangladeshi universities. Enhancing technology integration and addressing specific student needs could improve satisfaction levels.

Impact of AI on Future Careers

Table 6.2.10 Impact of AI on Future Careers

Opinion	Bangladesh (%)	Global (%)
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Yes	20.2	65
No	17.4	35
Not Sure	62.4	-

Discussion

A significantly lower percentage of Bangladeshi students (20.2%) believe that AI will impact their future careers compared to the global average (65%). The high level of uncertainty (62.4%) among Bangladeshi students suggests a need for more information and career guidance regarding the implications of AI. Educational institutions could play a crucial role in providing resources and support to help students understand and prepare for AI-driven changes in the job market.

7.3 Conclusion

Overall, the primary data from Bangladesh reveals a generally higher familiarity and usage of AI in education compared to global averages, with students perceiving significant benefits in terms of academic performance and learning experience. However, there are areas of concern, such as feelings of guilt and lower satisfaction with current technology integration, which need to be addressed. By focusing on these aspects, educational institutions in Bangladesh can further enhance the effective integration of AI, aligning more closely with global trends and maximizing the potential benefits for students.

CHAPTER 8

IMPACT ON THE SOCIETY

8.1 Introduction

Artificial Intelligence (AI) integration in tertiary level education has significant implications for society, influencing various aspects of learning, teaching, and workforce development. This chapter explores the broader societal impact of AI in education, examining its strengths, weaknesses, opportunities, and threats.

8.2 Strengths

The integration of AI in tertiary education offers numerous strengths for society, including improved access to education, enhanced learning outcomes, and increased workforce readiness. AI-driven personalized learning platforms and intelligent tutoring systems empower learners, regardless of geographical location or socioeconomic status, to access high-quality educational resources and support.

8.3 Weaknesses

However, there are weaknesses associated with AI integration in education that need to be addressed. One major challenge is the disparity in technological infrastructure, especially in rural areas, which may hinder the widespread adoption of AI-driven educational tools. Furthermore, concerns arise regarding the quality and accuracy of AI-generated content, raising questions about its suitability for educational purposes. Ethical considerations surrounding data privacy, algorithm bias, and AI decision-making also pose significant challenges that require careful attention and regulation.

8.4 Opportunities

AI presents society with various opportunities to transform tertiary education, including the development of innovative teaching methods, the creation of new learning modalities, and the advancement of research capabilities. Additionally, AI-powered education technologies have the potential to address global challenges in education, such as teacher shortages and learning deficits, by scaling personalized learning experiences and adaptive support mechanisms.

8.5 Threats

While there are opportunities, there are also threats associated with AI integration in education that must be addressed. Job displacement is a significant concern, as automation of routine tasks through AI technologies may lead to redundancies among educators and administrative staff. This necessitates proactive measures for reskilling and upskilling to mitigate the impact on employment. Moreover, overreliance on AI-driven educational tools without human oversight may diminish critical thinking skills and social interaction among students, leading to a dehumanized learning experience. Additionally, the digital divide persists as socioeconomic disparities in access to technology and digital literacy skills may widen, exacerbating inequalities in educational outcomes.

8.6 Conclusion

The societal impact of artificial intelligence in tertiary education is multifaceted, encompassing a range of strengths, weaknesses, opportunities, and threats. While AI holds the promise of revolutionizing education and fostering societal progress, its implementation must be guided by principles of equity, transparency, and ethical responsibility. By addressing challenges and leveraging opportunities, society can harness the full potential of AI to create a more inclusive, accessible, and equitable educational landscape.

CHAPTER 9

CONCLUSION

9.1 Conclusion

This thesis has examined the role of Artificial Intelligence (AI) in tertiary-level education in Bangladesh, comparing local student experiences with global trends. My survey revealed that a significant majority of Bangladeshi students (66%) are familiar with AI in education, which is higher than the global average of 40%. This suggests better awareness and access to AI education in Bangladesh. However, there are still many students who are only somewhat familiar or not familiar at all, highlighting the need for more education and awareness.

A notable 73.4% of Bangladeshi students have used AI-powered tools in their studies, compared to 50% globally, showing a strong embrace of technology in the local education sector. Additionally, 69.1% believe AI can benefit their education, indicating broad support for integrating AI into learning environments.

Bangladeshi students also see a positive impact of AI on their academic performance, with 73.5% reporting improved grades, close to the global average of 68%. Furthermore, 71.8% believe AI enhances their learning experience, higher than the global figure of 53%, suggesting a strong perception of AI's value in education.

Despite these positive views, there are concerns. About 50.3% of students feel guilty about using AI for assignments, highlighting ethical issues and the need for clearer guidelines. Additionally, 72.5% believe stricter regulations are needed, emphasizing the importance of establishing robust ethical standards.

My SWOT analysis showed several strengths, like enhanced learning experiences and increased efficiency, but also weaknesses such as tech infrastructure challenges and ethical concerns. Opportunities for innovative teaching and lifelong learning are clear, but threats like job displacement and equity issues remain.

In conclusion, AI has the potential to transform tertiary level education in Bangladesh by offering personalized learning and improving efficiency. However, to fully realize these benefits, it is essential to address the challenges, ensure equitable access, and establish clear ethical guidelines. With these steps, AI can significantly enhance the educational landscape in Bangladesh, preparing students for a competitive global market.

9.2 Further Suggested Work

1. Conduct long-term studies to track the impact of AI on student performance, learning outcomes, and overall educational experiences over several years.
2. Expand Survey population.
3. Future work should involve policymakers, educators, and AI experts.
4. Collect both quantitative and qualitative data.
5. Examine the impact of AI on employment within the education sector, focusing on job displacement and the need for new skill sets.
6. Document and analyze case studies of successful AI integration in educational institutions both within Bangladesh and globally. These case studies can serve as models and provide practical insights for other institutions looking to adopt AI technologies.

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APPENDICES

Appendix A: Copy of the Survey Questionnaire

1. How familiar are you with the concept of Artificial Intelligence (AI) in education?

- Very Familiar
- Familiar
- Somewhat Familiar
- Not Familiar at all

2. Do you think AI can be beneficial for tertiary-level education in Bangladesh?

- Yes
- No
- Not Sure

3. Have you ever used AI-powered tools or technologies in education?

- Yes
- No

4. Do you think studying with ChatGPT is better than using a tutor?

- Yes
- No
- Not Sure

5. Do you believe AI has improved your grades?

- Yes
- No

6. Do you believe AI integration enhances the learning experience?

- Yes
- No

7. Do you believe that AI integration makes the education system more effective and efficient?

- Yes
- No
- Not Sure

8. Do you regularly use AI chatbots for educational purposes?

- Yes
- No
- Sometimes

9. Do you feel guilty for using AI for completing assignments?

- Yes
- No

10. Do you believe stricter regulations are needed for the use of such tools in Bangladeshi universities?

- Yes
- No

11. How satisfied are you with the current level of technology integration in your university's educational practices?

- Very Dissatisfied
- Dissatisfied
- Neutral
- Satisfied
- Very Satisfied

12. Do you think that AI will impact your future career?

- Yes
- No
- Not Sure

13. What type of institute do you belong to?

- Private University
- Public University
- National University
- Others

Appendix B: Plagiarism Report

