

**Research Methods Information Systems  
Final Research Paper**

**Artificial Intelligence Usage in  
Educational Work: Perceived  
Ethicality, Benefits, Trust**



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# **I. Background**

Artificial Intelligence (AI) is a field of computer science that works on creating machines that have the ability to do tasks that typically require human intelligence. Defined as “the science and engineering of making intelligent machines, where intelligence is the computational part of the ability to achieve goals in the world” (McCarthy, 2023). AI is achieved by examining the cognitive process and investigating the patterns of the human brain, such studies produce systems and tools that are intelligent. There are four different approaches that historically defined the field of AI, that is; thinking humanly, thinking rationally, acting humanly and acting rationally.

The reason for choosing the topic of “Artificial Intelligence in Education” stems from our curiosity about the possible usage of AI tools in higher education and whether it is ethical. As more tools of AI are emerging, we believe that in the future AI would grow even more and thus we want to discover further about the use of AI in education. The topic will focus on its use in education as many AI tools are compatible to use for education purposes.

Mathematicians and logicians like Alan Turing and John von Neumann started looking into the idea of artificial intelligence in the early 20th century. The emergence of electronic computers in the middle of the 20th century gave the field of artificial intelligence (AI) a foundation for further investigation. The Dartmouth conference introduced artificial intelligence as a discipline in 1956. John McCarthy, Marvin Minsky, and Claude Shannon were among the researchers who attended the conference and helped establish the discipline of artificial intelligence by coining the phrase.

In the early 21st century, machine learning, which employs algorithms to learn from data and enhance their performance over time, became more popular. Significant advances in speech and image recognition have been made possible by the creation of deep learning algorithms, which use neural networks to process data. Self-driving vehicles, medical diagnosis, fraud detection, and natural language processing are just a few of the modern uses for AI. Research and innovation in the field of AI development are still very busy, with new developments and applications appearing frequently.

As AI develops throughout the years, it started being used in the education field in the 1970s, where researchers created the Intelligent Tutoring System (ITS) and the Cognitive Tutor. In the 2000s, a new approach of AI in education emerged: Intelligent Learning Environments (ILEs). ILEs make use of AI to offer pupils individualised educational experiences that change based on their learning preferences. Today, AI has developed more approaches in the education field, including using adaptive assessments and chatbots.

While there are many potential benefits to using an AI, it raises ethical concerns that must be addressed. The issue of whether or not it is an ethical practice to use artificial intelligence in higher education remains controversial as AI becomes more prominent. Several potential ethical concerns must be taken into account. The first one is Bias. Depending on their training data, AI systems may be biased, which could lead to discrimination against certain student groups. A grading system based on artificial intelligence, for instance, could unfairly penalise students who speak English as a second language or who have different learning preferences.

The second concern involves privacy. The privacy of students may be compromised by AI systems that collect data on them. There is a risk that sensitive student information will be used for illegal activities such as discrimination or targeted advertising.

Additionally, there is a problem with transparency. It may be difficult to understand how AI systems function and make decisions. It may be difficult to evaluate the accuracy and fairness of these systems due to their lack of transparency.

The next and one of the most important issues is autonomy. There is a possibility that AI systems could replace human teachers, which would be detrimental to the autonomy and agency of students. It is crucial to consider how AI systems can complement rather than replace human educators. Students' accountability is the final concern. It is essential to implement procedures to ensure that students are accountable for their educational work.

## **II. Scope**

The purpose of this study is to determine whether or not the use of artificial intelligence in university education is an ethical practice. This research paper will serve as an inquiry as to whether the use of artificial intelligence will enhance the education level of university students or it will serve as a harmful effect on the development of university students in the present and future. The sample size for this research is 75 undergraduate students from a span of universities. This research will be conducted for a duration of 6 months, to gather sufficient levels of information for analysis. The topics discussed in this research paper are artificial intelligence and human educational learning. The theories used as the conceptual framework for this research are the theory of artificial intelligence as a field of study and the educational learning theory of Connectivism, first introduced by George

Siemens and Stephen Downes in 2005. The research will be focused on Indonesia, as the analysis and results from this research may be of benefit to the advancement of education in Indonesia with the use of artificial intelligence.

### **III. Objectives**

The objective of this research paper discussing artificial intelligence in higher level education for university students are as followed:

- To bring a rising conflict of opinions to light regarding the use of AI for educational work.
- To find out how much AI is used for education in higher education.
- To determine whether a student's usage of AI is influenced by the perceived benefits, trust and ethicality of AI based on the opinion and views of students.
- To analyse the reasons for students' views on AI ethicality, trust in AI and benefits and see the correlation between this and their AI usage.

### **IV. Benefits**

The benefits of conducting and drafting this research paper are as said:

- To add a source of information for other people in the topic of AI in the educational sphere.
- To gain recent insight and research on the application and ethicality of AI in universities.
- To discover and recognise the impact AI has brought in higher education.
- To be aware of how AI has been integrated in today's education in university.

## **V. Theoretical Foundation**

### *Theory*

The ‘Connectivism’ theory will serve as the framework to answer the research question. Making links between many sources of knowledge is essential, according to the learning theory known as connectivism. It was initially put forth by George Siemens and Stephen Downes in 2004, and it is based on the notion that information is not only disseminated through networks of people and resources, but also within each individual (Western Governors University, 2021). The process of building and navigating networks of connections is what connectivism defines as learning. In order to acquire and apply knowledge, learners should actively participate in building their own learning networks by seeking out and establishing connections with other learners, subject matter experts, and resources.

### *Concepts*

The research question questions the ethicality of the use of AI in education. To answer the research question, the criterias to determine an answer require a concept of education to serve as a framework. The concept of education that will be used for this research paper is Bloom’s taxonomy. Bloom’s taxonomy is a system for classifying several levels of learning objectives or academic aims. Benjamin Bloom, an educational psychologist, first put out the taxonomy in 1956 (Mcdaniel & Armstrong, 2010). Since then, it has undergone various revisions.

Six levels, each of which denotes a distinct degree of complexity and mastery, are used to structure learning objectives in the taxonomy. In descending order of complexity, the six stages are:

- **Remembering:** At this level, you must recollect facts, definitions, or concepts that you have learned from memory.
- **Understanding:** At this level, knowledge or information must be understood and able to be articulated in one's own words.
- **Applying:** This stage is putting the information or knowledge to use in a fresh circumstance or setting, like when coming up with a solution or choosing a course of action.
- **Analysing:** At this level, the information or knowledge is dissected into its constituent parts and the links between those parts are examined.
- **Evaluating:** At this stage, judgments are made regarding the worth or calibre of the data or knowledge in light of predetermined standards or criteria.
- **Creating:** Using the information or expertise to produce original concepts, items, or solutions constitutes the creating stage.

The type of artificial intelligence used by students for their education in question, are natural language processing (NLP) AIs. The goal of NLP is to make it possible for computers to comprehend, interpret, and produce human language. NLP is a branch of computer science and artificial intelligence. It entails creating models and algorithms that can handle and evaluate huge amounts of natural language data, whether spoken language or written text (IBM, n.d.). Virtual assistants, chatbots, search engines, and language translation tools are just a few of the many uses for NLP. In fields like healthcare and finance, where a lot of textual data is produced and needs to be promptly and precisely examined, its significance has also grown. Overall, NLP is a crucial topic that has made it possible for computers to process, examine, and comprehend human language. It has a wide range of practical applications that could be advantageous to both individuals and enterprises.



## *Principles*

Additional criterias for guidance in the analysis process for this research will be needed, the principles of education and artificial intelligence shall be taken into consideration to drive conclusions.

**Educational Principles:** According to the Dartmouth Center for the Advancement of Learning (*Teaching & Learning Principles*, 2019).

- Students' prior knowledge can help or hinder learning.
- How students organise knowledge influences how they learn and apply what they know.
- Students' motivation determines, directs, and sustains what they do to learn.
- To develop mastery, students must acquire component skills, practice integrating them, and know when to apply what they have learned.
- Goal-directed practice coupled with targeted feedback enhances the quality of students' learning.
- Students' current level of development interacts with the social, emotional, and intellectual climate of the course to impact learning.
- To become self-directed learners, students must learn to monitor and adjust their approaches to learning.

**Artificial Intelligence Principles:** According to the OECD (OECD, n.d.).

- Inclusive growth, sustainable development and well-being.
- Human-centred values and fairness.
- Transparency and explainability.

- Robustness, security and safety.
- Accountability.

## VI. Related Works

	Paper 1	Paper 2	Paper 3	Paper 4	Paper 5
<b>Title</b>	Artificial Intelligence and its Implications in Education (Venkata Subrahmanyam Vampugani & Kailasam Swathi, 2018)	The Threat, Hype, And Promise of Artificial Intelligence in Education (Humble & Mozelius, 2022)	The Future of Higher Education in the Light of Artificial Intelligence Transformations (Aldosari, 2020)	A Common FrameWork for Artificial Intelligence in Higher Education (AAI-HE Model) (Jantakun et al., 2021)	University Students' Perceptions About Artificial Intelligence (Keleş & Aydın, 2021)
<b>Type</b>	Quantitative Research	Quantitative Research	Qualitative Research	Quantitative Research	Quantitative and Qualitative Research
<b>Objective</b>	To discuss the role of artificial intelligence in the education sector including its market size, impact of AI in education, case studies of current presence of AI in education (smart content, intelligent tutoring systems, virtual facilitators and learning environments etc) with an eye towards improving learning and life outcomes for all.	To identify a wide variety of strengths, weaknesses, opportunities, and threats for artificial intelligence in education.	To investigate whether Arab universities are inclined to apply AI in their education along with the possible scenarios where AI is used.	To formulate a framework for AI in higher education and evaluate it	To discover the university student's view on AI.
<b>Hypothesis</b>	AI is becoming better and better and will help people more in education in the future.	AI is rising in popularity and there are numerous questions that emerge.	AI is accepted and adopted in higher education in Arab universities	AI should be standardised and thus a framework is necessary.	AI is increasingly growing and university students are aware of AI.
<b>Data Collection Approach</b>	Survey Report and Case Studies	Google Scholar was used as the search engine to find research papers that	Primary data (open-ended questions and multiple-choice	Primary data (5-point Likert Scale-based suitability	Primary data (survey method and Word Association Test)

		had a potential to answer the aim and research question of the study. Results were filtered to only include papers with a publication year no older than 2015.	clauses)	measurement scale)	
<b>Data Sample</b>	People from all over the US	42 research papers.	Sample of 30 faculty members for the study population	Sample of 5 experts in the field of AI in higher education.	Sample of 130 fourth grade students in the Faculty of Education, Faculty of Arts and Sciences and Faculty of Economics and Administrative Sciences of a university in the Eastern Anatolia region in the 2018-2019 academic year.
<b>Analysis method</b>	Analysis was performed through case studies and data from websites.	Analysis was inspired by the six phases for conducting a thematic analysis presented by Braun and Clarke [8]: (1) familiarising yourself with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing potential themes, (5) defining and naming themes, and (6) producing the report.	Analysis was done through qualitative study of open-ended questions and multiple-choice clauses to faculty members of the university. The researcher had received data from the respondents and was able to conduct analysis.	Analysed made through mean and standard deviation.	Analysis was performed through content analysis.
<b>Result</b>	Highlighted the potential impacts of AI in education with some worldwide case-studies, issues and challenges associated.	The strengths, weaknesses, opportunities, and threats of using AI for education were identified after analysis.	Respondents had shown a positive reaction regarding Ai and how there is trust in it. The possible scenarios where AI can be applied can be seen through the	There was 7 sections of AAI-HE model as followed: 1.1) User Interactive Components and Technology of aI 1.2) Components	It could be argued that the students of the Faculty of Education are more knowledgeable than those from the Faculty of Economics and Administrative

			benefits from promoting academic guidance and enhancing student's scoring.	and Technology 1.3) Roles for AI in Education 1.4) Machine Learning and Deep Learning 1.5) DSS Modules 1.6) Applications of AI in Education 1.7) AI to enhance campus efficiencies 2) Result showed to be absolutely appropriate overall	Sciences and the Faculty of Arts and Sciences. In addition, another point found was that university students highlighted their negative view on AI through elaborating the negative impacts from it.
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*Paper 1: Artificial Intelligence and its Implications in Education (Venkata Subrahmanyam Vampugani & Kailasam Swathi, 2018)*

The authors go over a number of possible uses for AI in education, including individualised instruction, clever tutoring programs, and automated grading and feedback. By delivering more individualised and effective training, freeing up instructors' time, and facilitating more effective assessment and feedback, they contend that AI has the potential to improve educational outcomes. The authors also make note of a number of potential difficulties and dangers that could arise from the application of AI in education, including issues with data security and privacy, the possibility of bias in AI algorithms, and the need to make sure that AI is used in a way that enhances and supplements human instruction rather than substituting it. In order to ensure that AI is developed and implemented in a responsible and ethical manner, the article emphasises the necessity for continual research and discussion about its application in education. Overall, the paper offers a thorough and insightful analysis of the prospective effects of artificial intelligence (AI) on education, showing both the advantages and disadvantages of this quickly developing technology.

*Paper 2: The Threat, Hype, And Promise of Artificial Intelligence in Education*  
(Humble & Mozellus, 2022)

The ability to deliver more effective and individualised training, enhance evaluation and feedback, and support more productive administrative operations are just a few of the possible advantages of AI in education that the authors explore. They also draw attention to a number of potential risks and difficulties that could arise from the application of AI in education, including worries about privacy and security, the possibility of bias in AI algorithms, and the need to make sure that AI is used in a way that enhances and supplements human instruction rather than substituting it. According to the article, the present boom around AI in education has produced exaggerated expectations and a dearth of critical analysis of its possible effects. The authors argue that a more nuanced and fact-based strategy is required, one that highlights the necessity of continual investigation and review while taking into account both the potential advantages and risks of AI in education. Thus, the study offers a fair and thorough overview of the prospective effects of artificial intelligence (AI) on education, showing both the advantages and disadvantages of this quickly developing field of study. The authors contend that while AI has the potential to positively revolutionise education, caution should be exercised in its application to guarantee that it is done morally and responsibly.

*Paper 3: The Future of Higher Education in the Light of Artificial Intelligence Transformations* (Aldosari, 2020)

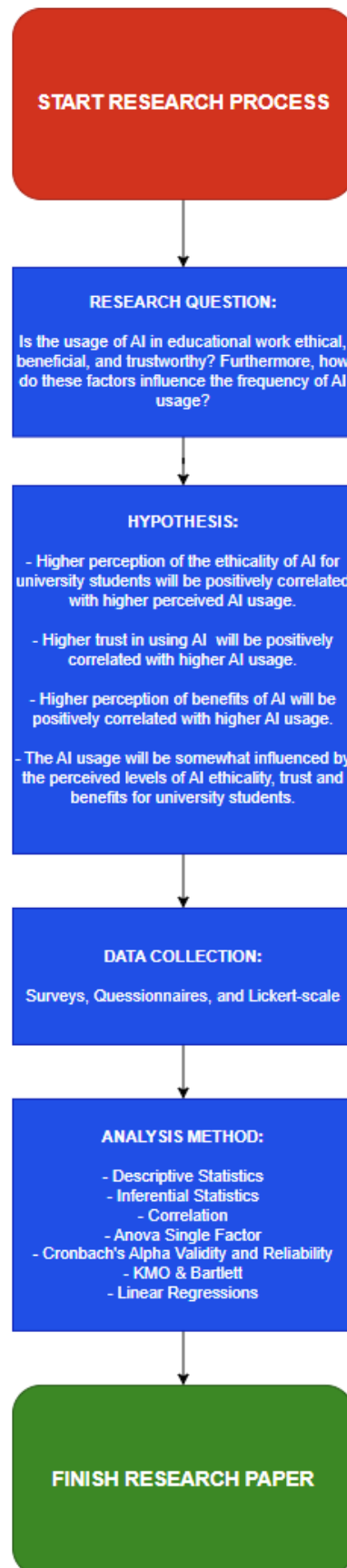
*Paper 4: A Common FrameWork for Artificial Intelligence in Higher Education (AAI-HE Model) (Jantakun et al., 2021)*

The author identifies and argues about the likely effects caused from artificial intelligence that occurs in higher education at Prince Sattam Bin Abdulaziz University. Qualitative research methodology is gained through the technique of open questionnaires on a sample of university students. The research concluded that the awareness and knowledge of using AI in education is decreasing over-time and that it is urgent to spread recognition across the university towards applying artificial intelligence in their studies.

*Paper 5: University Students' Perceptions About Artificial Intelligence (Keleş & Aydın, 2021)*

The author researches the views and thoughts university students have on the topic of artificial intelligence. Sample is collected from university students who gave their response in the form of an Independent Word Association Test. With the data collected, the author analysed using content analysis where it concluded that students across different faculties have a wide spectrum of knowledge regarding artificial intelligence with some having negative views and some having richer insight on it.

## VII. Methodology



To conduct the research process, five main steps were applied in the methodology. The methodology consisted of inquiring the research question, identifying the hypothesis, collecting the data, analysing the data and providing a conclusion at the end of the process.

Firstly, as for the research question, it was discussed among the researchers to find a feasible question that its answers and conclusions are able to be found upon with the timeline and scope identified.

Following the hypothesis, it was identified from personal experiences and observations. As said, our hypothesis on our research process is: The use of AI is ethical for university students but only to a certain extent; when it is used appropriately considering ethical guidelines. This means that the use of AI should complement rather than replace or complete the whole work for a student. If AI is used to make decisions, it is important to be transparent to ensure that the work considers the tool's algorithm and possible biases.

Furthermore, as for the data collection and analysis of data, the research process had focused on obtaining applied in this research is quantitative data and qualitative data in which was collected through surveys, questionnaires, likert-scales where the data was further analysed and interpreted to understand and determine whether AI is ethical in the background of university studies.

Hence, with the provided data and analysis, a conclusion is able to be built upon and a proven statement regarding the ethicality of the implications in AI in university studies are able to be identified. As a result of the five-step research process, a research paper is drafted and the experimental research has been documented.



## **VIII. Sampling Methods**

The sampling methods used in this research is purposive sampling, which is a non-random sampling technique where participants are chosen intentionally as they have a characteristic that aligns with our research objective. In this case, as we focus on whether AI is ethical to use in higher education, our sample consists of people studying higher education, specifically undergraduate students. This is because selecting this specific group allows us to focus the research on the use of AI within this group, as other groups may have different levels of exposure and usage of the AI technology. By implementing purposive sampling, the research can gain better insights into their usage of AI, their thoughts on the ethicality, beneficial, and trust in using AI.

## **IX. Hypothesis**

Will the increasing use of artificial intelligence in the education industry adhere to ethical conduct? Many of the current workforce and students hold a certain view on the positive use of artificial intelligence, conveyed in a study done of 350 people that reveals a significant positive relationship ( $p.001$ ) between their teaching self-efficacy, performance expectancy, effort expectancy and much more (Alhwaiti, 2023). In the short term, such benefits given by artificial intelligence will directly promote the continued acceptance of integrating artificial intelligence in students' lives which will transfer over to when they become workers. However, this raises questions about the overuse of AI for activities that normally call on individual skill development and critical thinking. Interestingly enough, a study done in Sweden by Chalmers of more than 5,894 students reveals that while this is not true for other AI-language tools, more than 60% of people think that using chatbots during exams is

cheating. Views from students from that study serve as the basis of our current hypothesis, and that is the use of AI is ethical for university students but only to a certain extent; when it is used appropriately considering ethical guidelines.

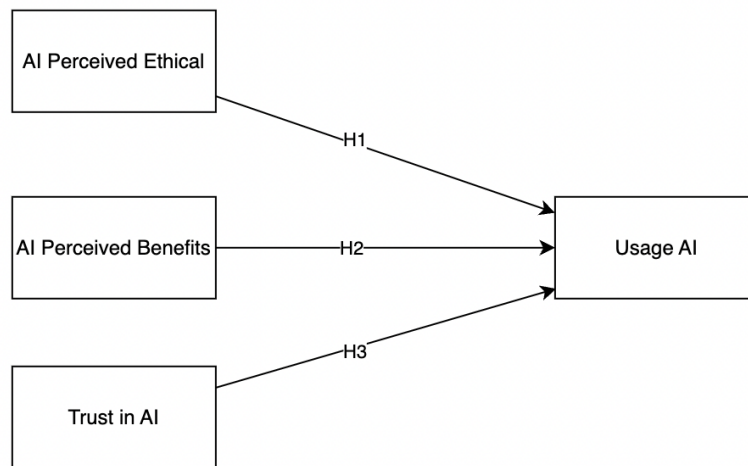
The majority of students oppose banning artificial intelligence in educational contexts. Overall, most students (56 %) are supportive of the employment of chatbots and other AI-based language aids in the classroom, and many believe that using AI improves their learning. When it comes to the ethics of education as set with a global standard, a student must perform in truth, fairness, dignity, and principle which is heavily emphasised for exams and final assignments. News around the world convey the threat artificial intelligence poses for these codes of ethics, with even Rehan Haque, the Chief Executive Officer of Metatalent.ai, a company that focuses on artificial intelligence is certain that more than 50% of students rely on AIs such as ChatGPT to cheat on their examinations (Correspondent, 2023). The ethical implications surrounding the use of AI in education remain a topic of ongoing debate, with careful consideration needed to strike a balance between technological advancements and nurturing essential human skills. The gradual increase in student's reliance on artificial intelligence, will promote more students to cheat and hence violate the code of ethics in education.

Based on the data regarding individuals' perceptions of AI ethics, trust, and benefits, we develop the following hypothesis:

1. Higher perception of the ethicality of AI for university students will be positively correlated with higher perceived AI usage.
2. Higher perception of benefits of AI will be positively correlated with higher AI usage.
3. Higher trust in using AI will be positively correlated with higher AI usage.

4. The AI usage will be somewhat influenced by the perceived levels of AI ethicality, trust and benefits for university students.

Through our research that will collect and incorporate both quantitative and qualitative data, we aim to test the validity of the formulated hypothesis. By analysing the data, we can evaluate the degree to which the factors of AI accessibility, benefits and usage in a week influence the perceived level of ethicality.



The research model is created based on the hypothesis, which shows that AI beneficial, trust in AI, and perceived AI ethicality has an influence on the levels of usage of AI, where higher perceived ethicality, benefits and trust would presumably lead to higher perceived level of AI usage. This implies that the more beneficial and ethical someone thinks AI, as well as the more trust they have in AI, will lead them to have higher AI usage.

## **X. Data Collection**

In this research, we collected data using a survey, using both quantitative and qualitative data. Qualitative data allows us to get insights into the subjective opinions and thoughts of the respondents in using AI, which in this case is done through giving open-ended questions on

the survey distributed. On the other hand, quantitative data is also needed for measurements and analysis, which allows us to examine any patterns, trends or relationship between one variable and another; such as the ethicality of AI and the usage of AI. Through gaining quantitative data, it is possible to identify any trends that emerge across the population.

In the questionnaire, the questions asked are of their university, major, whether they think AI is ethical, explaining why they think AI is ethical or not, whether they think AI is beneficial for their studies, whether they have trust in using AI for their studies.

The survey allows for a systematic and standardised approach, ensuring that each participant is presented with the same set of questions related to AI's ethical implications in education. This method allows us to collect data from a large sample size, increasing the generalizability of the findings. Additionally, survey responses can be easily quantified and analysed, enabling researchers to identify prevailing patterns, trends, and sentiments regarding the ethical implications of AI in Indonesia's education system. Ultimately, employing a questionnaire survey proves to be a suitable method for investigating the ethical dimensions of AI in education, providing comprehensive insights into public perceptions and concerns.

## **XI. Analysis Methods**

Using descriptive analysis for the topic of AI ethics in Indonesia's education allows researchers to provide a clear overview of participants' perceptions, quantify responses, identify common themes, conduct comparative analysis, and present findings in an accessible manner. Descriptive analyses include measuring the mean, minimum, maximum and standard deviation. Finding the mean can give a representation of the average response.

Standard deviation provides a quantitative measure of the variability or dispersion of responses related to the ethical implications of AI in education. By knowing the standard deviation, it helps understand how much the opinions or perceptions of respondents diverge from the average or central tendency. A larger standard deviation indicates a greater range of perspectives and highlights the diversity of opinions on AI ethics in the education context. Other than that, by analysing the standard deviation, researchers can identify potential outliers, which may represent unique or exceptional viewpoints on AI ethics in education.

Inferential statistics are also used to analyse the data. ANOVA is used to compare the means of three groups based on responses to different questions related to the belief in the ethicality, accessibility, and benefits of AI in the context of university education. The result will thus show the variation that refers to the differences in responses among the three questions. Apart from that, cronbach's alpha reliability and validity test will also be used to ensure that the data has internal consistency, checking the inter-relatedness of the items in the questionnaire. The KMO and Bartlett's Sphericity test will also be implemented to check if our data is suitable to use for factor analysis and to see the correlation in the data.

## **XII. Results**

### **The Survey**

<https://forms.gle/6mgxhjMacQHREUJ77>

### **Survey Editing and Responses**

<https://docs.google.com/forms/d/1EXG24c2UFQUq0zJVEXqKQKYEeN3igQY-5uwgN3Jok3Y/edit>

Questions:

1. What university are you from?
2. What university year are you in?
3. What major are you in?

### **Independent Variable 1: Perceived Ethical Implications of AI**

Quantitative

1. How concerned are you about potential ethical issues arising from the use of AI technology? (1 - Not concerned at all, 5 - Very concerned)
2. To what extent do you believe that AI should be programmed with a strict set of ethical guidelines? (1 - Not at all, 5 - Completely)
3. How ethical do you think AI is? (1 - Not ethical, 5 - Very ethical)

Qualitative

Based on your answers, please briefly explain the reasons behind your view on AI's ethicality

### **Independent Variable 2: Perceived Benefits of AI**

Quantitative

1. How beneficial do you think AI technology can be for enhancing your studies and academic performance? (1 - Not beneficial at all, 5 - Highly beneficial)
2. To what extent do you believe AI can assist in personalized learning and adapting to individual learning styles? (1 - Not at all, 5 - To a great extent)
3. How likely do you think AI can provide valuable insights and recommendations to support your decision-making in academic pursuits? (1 - Not likely at all, 5 - Very likely)

Qualitative

In what specific ways do you believe AI-based tools or applications have benefited your academic studies or enhanced your learning experience? Please provide examples if possible.

### **Independent Variable 3: Trust in AI Systems**

#### **Quantitative**

1. How confident are you in the ability of AI systems to safeguard your privacy and handle your personal data responsibly in an academic setting? (1 - Not confident at all, 5 - Completely confident)
2. To what extent do you believe that AI technology can effectively enhance the learning experience for university students? (1 - Not at all, 5 - To a great extent)
3. How comfortable are you with relying on AI-based tools or applications for academic tasks such as research, writing, or studying? (1 - Not comfortable at all, 5 - Very comfortable)

#### **Qualitative**

What factors or experiences would make you feel more confident and comfortable relying on AI-based tools or applications for your academic tasks?

### **Dependent Variable: Usage of AI among University Students**

#### **Quantitative**

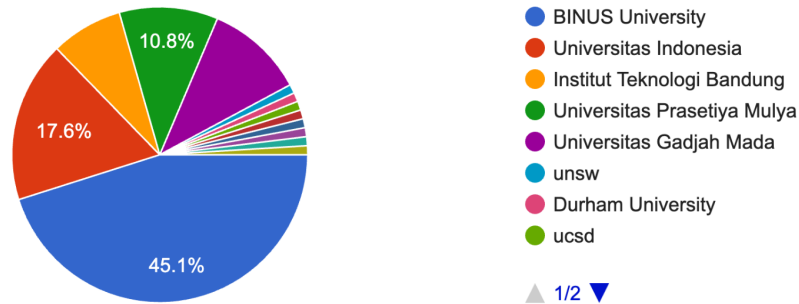
1. How frequently do you currently use AI-based tools or applications for your academic tasks? (1 - Never, 5 - Very frequently)
2. To what extent has the availability of AI technology influenced your decision to adopt and integrate it into your academic routine? (1 - Not at all, 5 - To a significant extent)
3. How likely are you to explore and utilise new AI-based tools or applications in the future to enhance your learning and academic performance? (1 - Not likely at all, 5 - Very likely)

#### **Qualitative**

Can you describe how the ethical considerations, perceived benefits, and trust in AI systems have influenced your decision to use AI-based tools or applications in your academic studies?

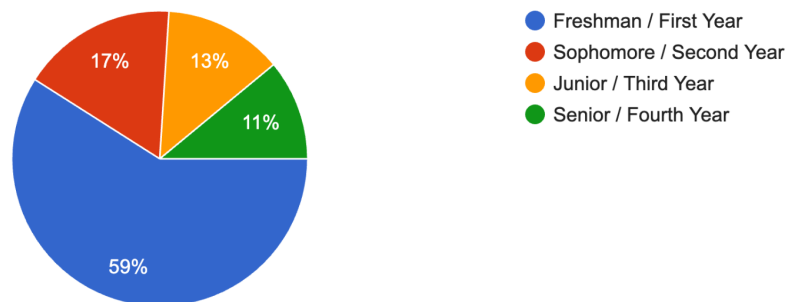
What university are you from?

102 responses



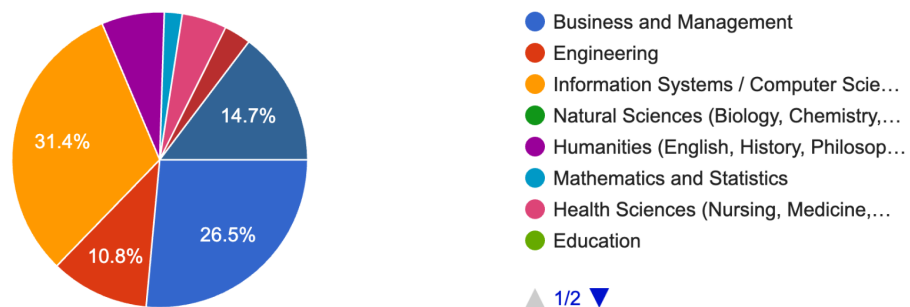
What university year are you in?

100 responses



What major are you in?

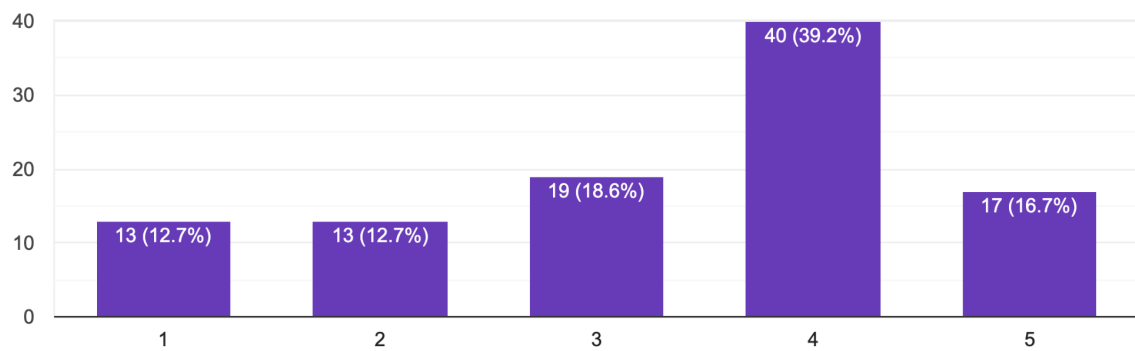
102 responses





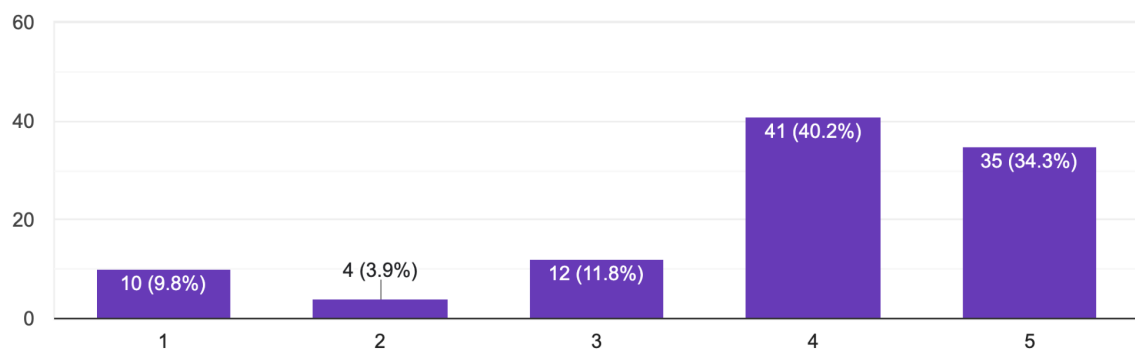
### How concerned are you about potential ethical issues arising from the use of AI technology?

102 responses



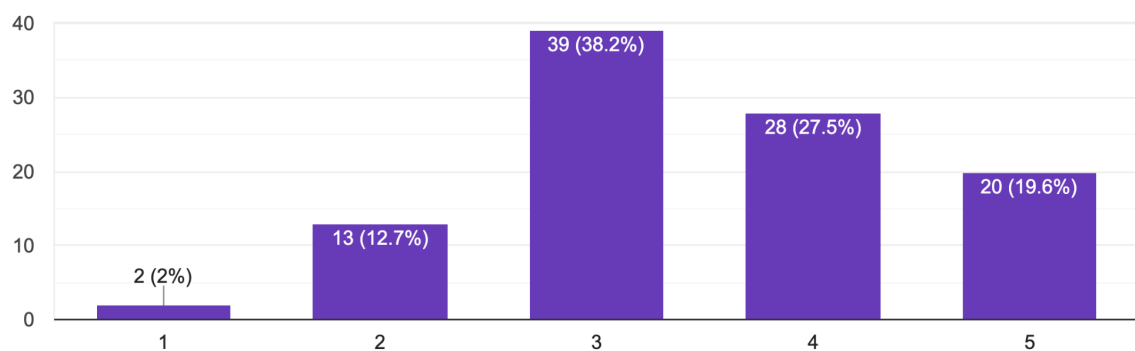
### To what extent do you believe that AI should be programmed with a strict set of ethical guidelines?

102 responses



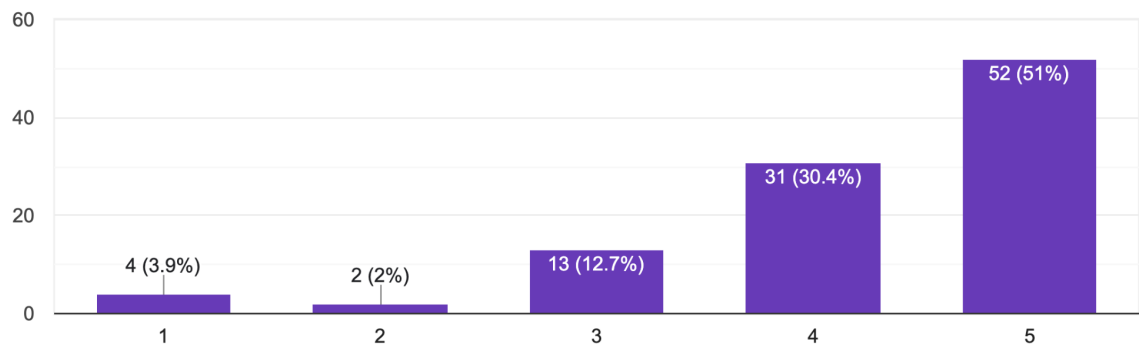
### How ethical do you think AI is?

102 responses



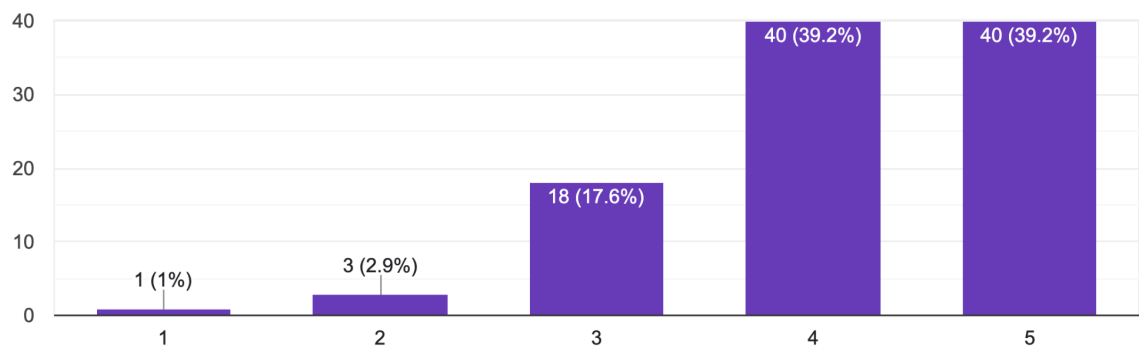
How beneficial do you think AI technology can be for enhancing your studies and academic performance?

102 responses



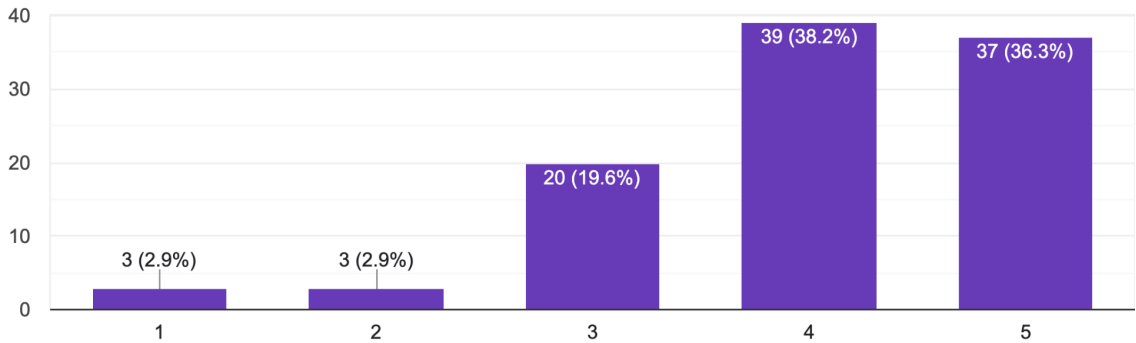
To what extent do you believe AI can assist in personalized learning and adapting to individual learning styles?

102 responses



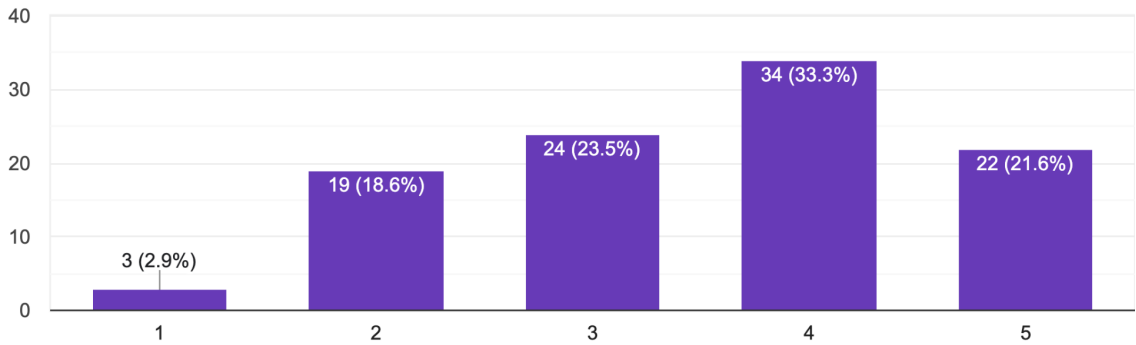
How likely do you think AI can provide valuable insights and recommendations to support your decision-making in academic pursuits?

102 responses



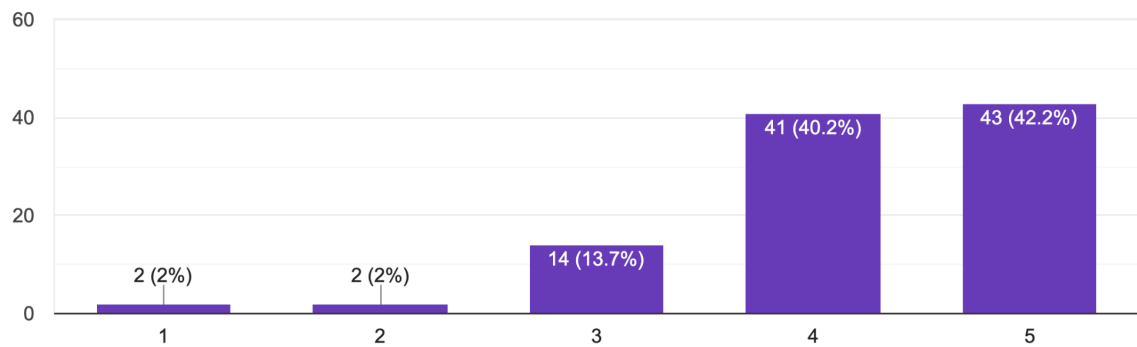
How confident are you in the ability of AI systems to safeguard your privacy and handle your personal data responsibly in an academic setting?

102 responses



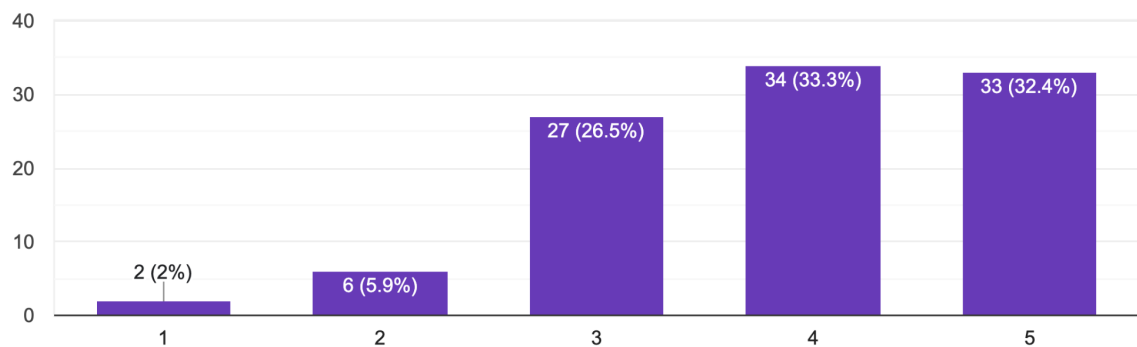
To what extent do you believe that AI technology can effectively enhance the learning experience for university students?

102 responses



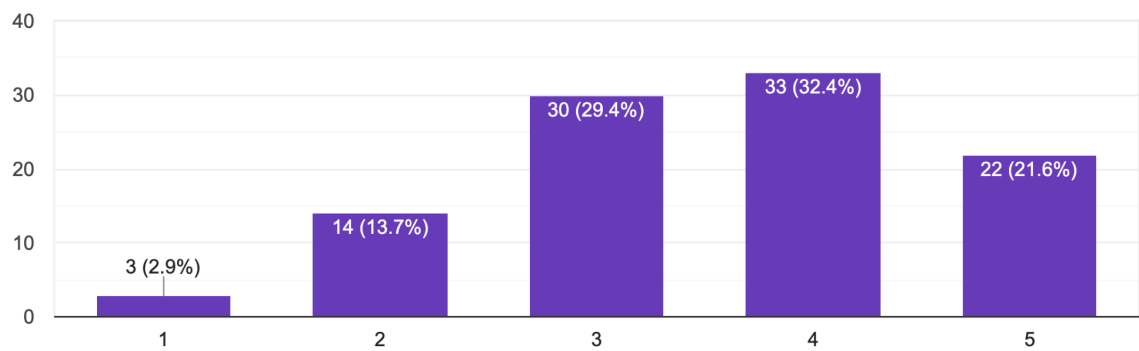
How comfortable are you with relying on AI-based tools or applications for academic tasks such as research, writing, or studying?

102 responses



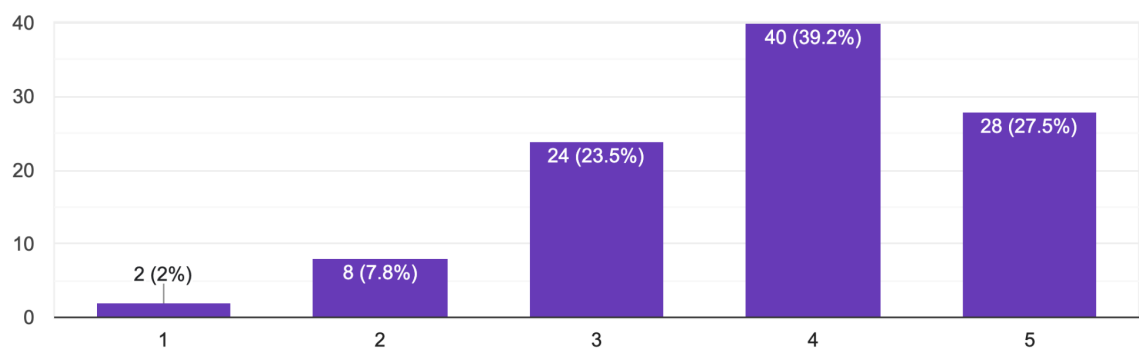
How frequently do you currently use AI-based tools or applications for your academic tasks?

102 responses



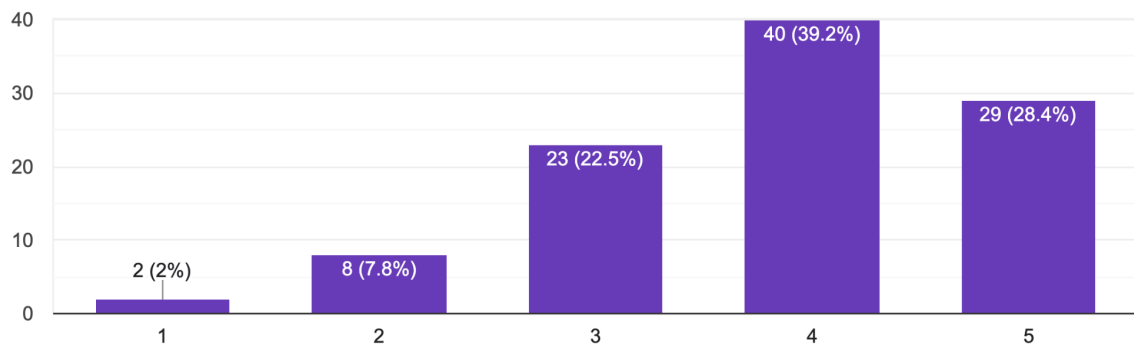
To what extent has the availability of AI technology influenced your decision to adopt and integrate it into your academic routine?

102 responses



How likely are you to explore and utilize new AI-based tools or applications in the future to enhance your learning and academic performance?

102 responses



### Qualitative Data Results (responses from survey)

<https://docs.google.com/forms/d/1EXG24c2UFQUq0zJVEXqKQKYEeN3igQY-5uwgN3Jok3Y/edit#settings>

## XIII. Discussion

### 1. Descriptive Statistics

Based on the results we received, we analysed the descriptive statistics of our quantitative questions;

How concerned are you about potential ethical issues arising from the use of AI technology?	
Mean	2,59
Standard Error	0,122346585
Median	2
Mode	2
Standard Deviation	1,22346585
Sample Variance	1,496868687
Kurtosis	-0,541734956
Skewness	0,631282329
Range	4
Minimum	1
Maximum	5
Sum	259
Count	100
Largest(1)	5
Smallest(1)	1

The mean for this question is at 2.59, indicating that on average respondents are somewhat concerned about the potential ethical issues arising from AI technologies. The data points are somewhat dispersed, with a standard deviation of 1.22, suggesting that individual responses vary widely. The most frequently occurring concern level is 2, which is also the median value. The data distribution is slightly negatively skewed (skewness = 0.63) and has a small kurtosis value (-0.54), indicating a relatively symmetrical and less peaked distribution. Overall, this data suggests that there is some concern relating to ethical issues arising from the use of AI technology, but it is not high nor unanimous among the respondents. With the lowest value being 1 and the highest being 5 shows that the respondents have varying opinions on this.

<i>To what extent do you believe that AI should be programmed with a strict set of ethical guidelines?</i>	
Mean	2,15
Standard Error	0,122577537
Median	2
Mode	2
Standard Deviation	1,225775368
Sample Variance	1,502525253
Kurtosis	0,576074192
Skewness	1,184890457
Range	4
Minimum	1
Maximum	5
Sum	215
Count	100
Largest(1)	5
Smallest(1)	1

The mean belief level is 2.15, indicating a relatively low average belief in the necessity of strict ethical guidelines for AI. The data points are somewhat dispersed, with a standard deviation of 1.23, suggesting that individual beliefs vary widely. The most frequent answer is 2, again showing that there is a low average belief of AI having to be made with strict ethical guidelines. The data distribution is positively skewed (skewness = 1.18) and has a positive kurtosis value (0.58), indicating that it has a little to moderately peaked form and is positively skewed to the right. The scale of beliefs ranges from 1 to 5, with 1 denoting the lowest level of belief in ethical standards and 5 denoting the highest level of belief. This data shows that

overall there is a low average in the belief of AI having to be programmed with strict ethical guidelines, this might show a sign that some respondents are not fully aware of the ethical concerns of AI or they are aware of the ethical concerns but it is not their priority.

<i>How ethical do you think AI is?</i>	
Mean	3,49
Standard Error	0,10100005
Median	3
Mode	3
Standard Deviation	1,0100005
Sample Variance	1,02010101
Kurtosis	-0,57847887
Skewness	-0,09223894
Range	4
Minimum	1
Maximum	5
Sum	349
Count	100
Largest(1)	5

The third quantitative question for the first construct asks “How ethical do you think AI is?” to see in a likert scale if respondents think AI is ethical or not, as this presumably influences their answers in the other questions. The mean ethicality rating is 3.49 out of 5, indicating a moderately positive perception of AI's ethics on average. The data points are relatively close to the mean, shown with a small standard deviation of 1.01, suggesting that the perceived ethicality of AI is relatively consistent among the respondents. The mode of this question is 3, which is also the median value. The data distribution is slightly negatively skewed (skewness = -0.09) and has a negative kurtosis value (-0.58), indicating a distribution that is slightly skewed to the left and has a slightly flattened shape.

The second construct focuses on the perceived benefits of AI towards one's studies.



*How beneficial do you think AI technology can be for enhancing your studies and academic performance?*

Mean	4,21
Standard Error	0,101796986
Median	4,5
Mode	5
Standard Deviation	1,017969855
Sample Variance	1,036262626
Kurtosis	2,101981511
Skewness	-1,490624977
Range	4
Minimum	1
Maximum	5
Sum	421
Count	100
Largest(1)	5
Smallest(1)	1

The data reveals that respondents have a generally positive perception of AI's ability to enhance studies and academic performance, as indicated by the mean benefit rating of 4.21, which is close to the maximum of 5. The data points are closely scattered around this average, with a small standard deviation of 1.02, suggesting a relatively consistent agreement among the respondents regarding the benefits of AI in this context. This means that most respondents agree that AI is beneficial for their studies. The most commonly reported benefit rating is 5, further highlighting the prevalent belief in the positive impact of AI in one's studies and academic performance. Additionally, the median value of 4.5 indicates that a majority of participants expressed a positive evaluation of AI's potential benefits for studies and academic performance.

The distribution of the data is characterised by a negative skewness value of -1.49, indicating a leftward skew and suggesting that there are more responses towards the higher end of the benefit ratings. The positive kurtosis value of 2.10 suggests a relatively peaked shape, indicating that the data is more concentrated around the central values and has heavier tails compared to a normal distribution.

<i>To what extent do you believe AI can assist in personalized learning and adapting to individual learning styles?</i>	
Mean	4,12
Standard Error	0,087939373
Median	4
Mode	4
Standard Deviation	0,879393731
Sample Variance	0,773333333
Kurtosis	0,622995466
Skewness	-0,875030702
Range	4
Minimum	1
Maximum	5
Sum	412
Count	100
Largest(1)	5
Smallest(1)	1

Similar to the previous question, when asked to what extent do respondents believe AI can assist in personalised learning and adapting individual learning styles, the average is at 4.12, showing a high belief that AI can assist in one's studies. The data points are also close to the mean, with a small standard deviation value of 0.88, suggesting that the belief in AI's capabilities in this context is consistent among respondents. The most frequently reported belief level is 4, showing that most respondents show a high belief in AI being able to assist in learning. The median value is 4, indicating that the majority of respondents expressed a positive belief in AI's ability to personalise learning and adapt to individual learning styles.

The data distribution is negatively skewed (-0.88), indicating a slight leftward skew, suggesting that there is a concentration of responses towards the higher belief levels. The positive kurtosis value (0.62) indicates a distribution that is slightly more peaked than a normal distribution, but not excessively so. In summary, the data indicates that the surveyed population holds an optimistic view regarding the potential of AI to enhance personalised learning and accommodate individual learning styles.

<i>How likely do you think AI can provide valuable insights and recommendations to support your decision-making in academic pursuits?</i>	
Mean	4,02
Standard Error	0,097421297
Median	4
Mode	4
Standard Deviation	0,974212969
Sample Variance	0,949090909
Kurtosis	1,11585348
Skewness	-1,043832931
Range	4
Minimum	1
Maximum	5
Sum	402
Count	100
Largest(1)	5
Smallest(1)	1

A mean likelihood rating of 4.02 in the data suggests a moderate to high average belief in AI's potential to offer insightful analyses and suggestions for academic decision-making. The data points are densely clustered around this average and have a low standard deviation of 0.97, indicating that respondents generally believed in the possibilities of AI. A significant portion of the respondents expressed a positive belief in AI's ability to provide helpful support, as seen by the most often reported likelihood rating of 4, which is also the mode value. The median value is also 4, which again indicates a significant portion of participants.

Furthermore, the data distribution is negatively skewed (-1.04), indicating a concentration of responses towards higher likelihood ratings. The positive kurtosis value (1.12) suggests a distribution that is slightly more peaked than a normal distribution. All in all, the data for this question shows that there is a generally positive belief that AI can provide valuable insights and recommendations to support decision-making in academic pursuits.

The third construct focuses on the trust/confidence of the respondents in using AI.

<i>How confident are you in the ability of AI systems to safeguard your privacy and handle your personal data responsibly in an academic setting?</i>	
Mean	3,55
Standard Error	0,109521457
Median	4
Mode	4
Standard Deviation	1,095214568
Sample Variance	1,199494949
Kurtosis	-0,892764668
Skewness	-0,294808556
Range	4
Minimum	1
Maximum	5
Sum	355
Count	100
Largest(1)	5
Smallest(1)	1

From this data, it reveals a moderate level of confidence, with a mean rating of 3.55, regarding the ability of AI systems to safeguard privacy and responsibly handle personal data. The data points are closely clustered around the mean, indicated by a standard deviation of 1.10, suggesting a moderate level of consistency in confidence among the surveyed individuals. The mode of this data is 4. Additionally, the median value of 4 indicates that a significant portion of respondents expressed moderate to high levels of confidence in AI systems. Overall, the data indicates that individuals have a moderate level of confidence in the ability of AI systems to protect privacy and handle personal data responsibly.

<i>To what extent do you believe that AI technology can effectively enhance the learning experience for university students?</i>	
Mean	4,18
Standard Error	0,089193921
Median	4
Mode	5
Standard Deviation	0,891939211
Sample Variance	0,795555556
Kurtosis	1,923879127
Skewness	-1,236322919
Range	4
Minimum	1
Maximum	5
Sum	418
Count	100
Largest(1)	5
Smallest(1)	1

The data strongly supports the belief that AI technology has the potential to effectively enhance the learning experience for university students. With a mean belief rating of 4.18, there is a relatively high average confidence in AI's ability to improve learning outcomes. A small standard deviation of 0.89 indicates that the data points are closely clustered around the mean, which suggests that the respondents held similar beliefs on this question. The most frequently reported belief rating is 5, which also serves as the median value, underscoring the widespread belief in AI's ability to improve the learning experience. Additionally, the distribution of the data is negatively skewed (-1.24), which indicates that responses are concentrated in the direction of greater belief ratings. Overall, these findings offer strong support for the generally held idea that AI technology may significantly improve university students' learning experiences.

*How comfortable are you with relying on AI-based tools or applications for academic tasks such as research, writing, or studying?*

Mean	3,91
Standard Error	0,096499333
Median	4
Mode	5
Standard Deviation	0,964993327
Sample Variance	0,931212121
Kurtosis	-0,411646634
Skewness	-0,505093395
Range	4
Minimum	1
Maximum	5
Sum	391
Count	100
Largest(1)	5
Smallest(1)	1

The data reveals that the surveyed respondents display a moderate to high level of comfort when it comes to utilising AI-based tools or applications for academic tasks such as research, writing, or studying. With a mean comfort rating of 3.91, there is an overall positive sentiment towards the use of AI in academic contexts. The data points are closely scattered around the mean of 3.91, indicated by a small standard deviation of 0.96, suggesting a consistent level of comfort among the respondents. However, seen by the largest value being 5 and lowest being 1, there are still a few respondents that do not feel comfortable relying on AI to help with their academic tasks. With the median value of 4, it shows that 50% of the respondents chose 4 or 5 in this question, indicating that they feel comfortable in using AI in academic tasks.

The last construct; the dependent variable of “Usage of AI”

<i>How frequently do you currently use AI-based tools or applications for your academic tasks?</i>	
Mean	3,56
Standard Error	0,10760947
Median	4
Mode	4
Standard Deviation	1,076094697
Sample Variance	1,157979798
Kurtosis	-0,608694842
Skewness	-0,332159251
Range	4
Minimum	1
Maximum	5
Sum	356
Count	100
Largest(1)	5
Smallest(1)	1

This data shows that respondents have a moderate level of current usage of AI-based tools or applications for their academic tasks. With a mean frequency rating of 3.56 out of 5, it suggests that the respondents use AI tools or applications moderately often. The data points are closely clustered around the mean, evidenced by a standard deviation of 1.08, indicating a moderate level of variability in the frequency of usage among the respondents. This data also shows that the lowest (minimum value) is 1 and the maximum value is 5, this means that there are respondents who chose 1 and 5, thus, indicating that the answer is not unanimous. The mode value is 4, which means that most respondents frequently use AI tools for their academic tasks. In general, this data indicates that the participants have a moderate level of engagement with AI-based tools or applications for their academic tasks. This suggests that there is room for exploring and incorporating AI technologies further into academic settings to enhance the learning experience and improve efficiency.

<i>To what extent has the availability of AI technology influenced your decision to adopt and integrate it into your academic routine?</i>	
Mean	3,83
Standard Error	0,09954949
Median	4
Mode	4
Standard Deviation	0,995494903
Sample Variance	0,991010101
Kurtosis	-0,017770377
Skewness	-0,652696357
Range	4
Minimum	1
Maximum	5
Sum	383
Count	100
Largest(1)	5
Smallest(1)	1

The statistics show that the respondents' decisions to acquire and incorporate AI technology into their academic routines were reasonably influenced by its availability. With a mean influence rating of 3.83, it indicates that AI technology has had a moderate overall impact on their decision-making. With a standard deviation of 0.99, the data points are reasonably near to the mean, indicating a moderate degree of consistency in the effect felt by the respondents. Both the median and mode of this data is 4, this shows that most of the respondents think that the availability of AI technology does play a role in their decision of using it in their academic routine. The data distribution shows a small amount of leftward skewness (skewness = -0.65), which points to a slight clustering of responses towards higher influence ratings.

*How likely are you to explore and utilize new AI-based tools or applications in the future to enhance your learning and academic performance?*

Mean	3,8
Standard Error	0,09987365
Median	
Mode	
Standard Deviation	0,99873657
Sample Variance	0,99747474
Kurtosis	0,01218084
Skewness	-0,68518497
Range	
Minimum	
Maximum	
Sum	38
Count	10
Largest(1)	
Smallest(1)	

From this data, it can be seen that there is a moderate likelihood among the respondents to explore and utilise new AI-based tools or applications in the future, with the aim of enhancing their learning and academic performance. The average likelihood rating of 3.85 suggests a generally positive sentiment towards the adoption of these technologies. The data points closely align with the mean as evidenced by the small standard deviation of 0.99, reflecting a consistent level of likelihood expressed by the respondents. The mode value of 4, which is also the most frequently reported rating, signifies a significant number of individuals who expressed a moderate likelihood to explore and utilise new AI-based tools or applications. The data's distribution has a minor negative skewness ( -0.68), which indicates that responses lean slightly more toward higher likelihood ratings.

## 2. Inferential Statistics (T-test & regression)

t-Test: Paired Two Sample for Means		
	MEAN ETHICAL	MEAN USAGE
Mean	2,756666667	3,746666667
Variance	0,720213244	0,913849607
Observations	100	100
Pearson Correlation	0,536103325	
Hypothesized Mean Difference	0	
df	99	
t Stat	-11,32476478	
P(T<=t) one-tail	7,2432E-20	
t Critical one-tail	1,660391156	
P(T<=t) two-tail	1,44864E-19	
t Critical two-tail	1,984216952	

The "Mean Ethical" variable has an average value of approximately 2.756666667, while the "Mean Usage" variable has an average value of approximately 3.746666667. As variance measures the spread of the data around the mean, in this analysis, the variance for the "Ethical" variable is approximately 0.720213244, and for the "Usage" variable, it is higher at approximately 0.913849607. With a Pearson correlation coefficient of 0.536103325, which measures the strength and direction of the linear relationship between two variables, this suggests a moderate positive correlation between the two variables.

The calculated t statistic of -11.32476478 shows a significant difference between the means of the "Ethical" and "Usage" variables. This statistic quantifies how much the sample means differ relative to the variability in the data, providing evidence of a meaningful distinction. The one-tail probability, denoted as  $P(T \leq t)$  one-tail, represents the likelihood of obtaining a t statistic as extreme as the observed value under the assumption of no difference between means (null hypothesis). In this case, the one-tail probability is 7.2432E-20, an extremely small value. This indicates strong evidence against the null hypothesis, further supporting the presence of a significant difference between the "Ethical" and "Usage" variable means.

In summary, the data reveals a statistically significant distinction between the means of the "Ethical" and "Usage" variables, accompanied by a moderate positive correlation between them. The presence of small p-values and large t statistics strongly contradicts the null hypothesis.

t-Test: Paired Two Sample for Means		
	MEAN BENEFIT	MEAN USAGE
Mean	4,116666667	3,746666667
Variance	0,696689113	0,913849607
Observations	100	100
Pearson Correlation	0,818068776	
Hypothesized Mean Difference	0	
df	99	
t Stat	6,699213817	
P(T<=t) one-tail	6,44091E-10	
t Critical one-tail	1,660391156	
P(T<=t) two-tail	1,28818E-09	
t Critical two-tail	1,984216952	

The Mean Benefit is approximately 4.116666667, while the Mean Usage is approximately 3.746666667. The mean for the variable "Benefit" is slightly higher. The Benefit variable has a smaller variance of approximately 0.696689113, indicating that the data points are



relatively close to the mean, in comparison with the Usage variable which has a higher variance at 0.9, though it still can be considered low. This means that in the variable Usage, there is higher variability than in variable Benefit, meaning that respondents think consistently more alike regarding the benefits of AI, and has a more varied usage of AI.

We can conclude that the observed difference between the means of the "Benefit" and "Usage" variables is statistically significant based on the modest p-value of 6.44091E-10. This implies that there is a real and significant difference between the groups being compared in terms of their ratings on benefit and usage. The calculated t statistic of 6.699213817 is greater in magnitude than the critical t value of 1.660391156 (one-tail), indicating a significant difference between the groups. This means that the observed difference is unlikely to be a result of random variability, but rather reflects a genuine disparity in the benefit and usage scores. Thus, we can conclude that the data provides strong evidence supporting the existence of a meaningful distinction between the groups in terms of their benefit and usage.

The small p-value of 1.28818E-09 (two-tail) and the large t statistic of 6.699213817 indicate that there is a significant difference between the means of the two variables. This implies that the observed difference is unlikely to be due to chance but rather suggests a genuine distinction in the benefit and usage scores.

t-Test: Paired Two Sample for Means		
	MEAN CONFIDENT	MEAN USAGE
Mean	3,88	3,746666667
Variance	0,726195286	0,913849607
Observations	100	100
Pearson Correlation	0,813731398	
Hypothesized Mean Difference	0	
df	99	
t Stat	2,378474902	
P(T<=t) one-tail	0,009651642	
t Critical one-tail	1,660391156	
P(T<=t) two-tail	0,019303283	
t Critical two-tail	1,984216952	

Based on the t-test table above, the mean confident score is approximately 3.88, while the mean usage score is approximately 3.746666667. This shows that both variables have a

similar mean value. As for variance, in this case, the variance for confidence is approximately 0.726195286, and for usage, it is approximately 0.913849607, this means that there is slightly lower variability in the variable confidence, though again the values are not contrasting. The linear link between the "Confident" and "Usage" variables is measured by the Pearson correlation coefficient. The approximate value of 0.813731398 indicates a strong positive correlation between these variables, indicating that the "Usage" score tends to rise as the "Confident" score does.

The t statistic of approximately 2.378474902 measures how much the sample means differ relative to the variability in the data for the paired observations. The likelihood of getting a t statistic that is as extreme as the observed value under the premise that there is no difference in means is represented by the  $P(T=t)$  one-tail value, which for this study is roughly 0.009651642, which indicates that the means differ statistically significantly.

A p-value below a predetermined significance level (often 0.05) is typically considered statistically significant and in this case, the p-value of 0.019303283 is below the significance level, indicating that the observed difference between the means of the "Confident" and "Usage" variables is statistically significant. This indicates that there is very little chance of accidentally discovering such a discrepancy between the means. The data reveals that the "Confident" and "Usage" variables have a real and statistically significant relationship.

### 3. Correlation & ANOVA

	<i>MEAN ETHICAL</i>	<i>MEAN BENEFIT</i>	<i>MEAN CONFIDENT</i>	<i>MEAN USAGE</i>
MEAN ETHICAL	1			
MEAN BENEFIT	0,479368386	1		
MEAN CONFIDENT	0,430994957	0,782001109	1	
MEAN USAGE	0,536103325	0,818068776	0,813731398	1

The relationship between "Benefit" and "Usage" is roughly 0.818068776. This suggests that there is a significant positive link between these two factors. It implies that the "Usage" scores are likely to rise in tandem with rising "Benefit" scores. Comparatively more strongly correlated than the correlations seen above is the association between these variables. This correlation suggests that most people who think rated benefit higher also uses AI more frequently, as shown by the high correlation. However, still not every respondent who rated benefit high also reported high usage, thus the correlation is not very close to 1.

Another strong positive correlation is seen between the variables "Confident" and "Usage", with a correlation coefficient of roughly 0.813731398. This suggests that there is a correlation between rising "Confident" ratings and rising "Usage" scores. Compared to the correlations found between other factors, the association between these variables is considerably greater. This shows that people who demonstrated higher confidence and trust in using AI to help in their academic journey reported higher AI usage as well.

The "Ethical" and "Usage" variables have a about 0.536103325 correlation coefficient, which indicates a somewhat positive relationship. This suggests that there is a tendency for the scores for "Usage" to grow as the scores for "Ethical" increase. Though there is a positive correlation between these factors, it is clear that the correlation is not particularly strong, indicating that the association between them is not very strong or conclusive. It can be assumed that other factors or variables may also influence the relationship between ethical considerations and AI usage patterns, as their relationship is not as strong. The moderate positive correlation suggests that there is some agreement between individuals who rate higher in "Ethical" regarding the importance of considering ethics and their actual usage behaviour.

		How likely do					To what		
		you think AI	How confident	To what	How	How	extent has		
		can provide	are you in the	extent do you	comfortable	frequently	the		
		valuable	ability of AI	believe that	are you with	do you	availability of		
How	To what extent	insights and	systems to	AI technology	relying on	currently	AI technology		
concerned	do you believe	recommendations to	safeguard your	can	AI-based tools	use	influenced		
about	that AI should	you think AI	AI can assist in	privacy and	effectively	or applications	AI-based	your decision	
potential	be	technology can be	personalized	support your	handle your	enhance the	tools or	to adopt and	
ethical issues	programmed	for enhancing	learning and	decision-making in	personal data	learning	tasks such as	applications	
arising from	with a strict set	your studies and	adapting to	ing in	responsibly in	experience for	research,	for your	into your
the use of AI	of ethical	do you think	academic	individual	an academic	university	writing, or	academic	academic
technology?	guidelines?	AI is?	performance?	learning styles?	pursuits?	setting?	students?	studying?	tasks?
									routine?

How concerned  
are you about  
potential ethical  
issues arising  
from the use of  
AI technology? 1

To what extent  
do you believe  
that AI should be  
programmed  
with a strict set  
of ethical  
guidelines? 0,63413597 1

How ethical do  
you think AI is? 0,139699042 0,225593957 1

How beneficial  
do you think AI  
technology can  
be for enhancing  
your studies and  
academic  
performance? 0,069829863 0,225446863 0,61609133 4 1

To what extent  
do you believe AI  
can assist in  
personalized  
learning and  
adapting to  
individual  
learning styles? 0,12129757 0,320476845 0,58136742 9 0,671146736 1

How likely do you think AI can provide valuable insights and recommendations to support your decision-making in academic pursuits?

0,167966509	0,310431707	6	0,53402262	0,606843186	0,645640809	1
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How confident are you in the ability of AI systems to safeguard your privacy and handle your personal data responsibly in an academic setting?

0,004146068	0,178697435	8	0,60313818	0,547680125	0,591508967	0,444001594	1
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To what extent do you believe that AI technology can effectively enhance the learning experience for university students?

0,234925043	0,344609695	3	0,41688603	0,603190016	0,744859684	0,588666524	0,456004288	1
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How comfortable are you with relying on AI-based tools or applications for academic tasks such as research, writing, or studying?

0,062541173	0,301869353	4	0,53280281	0,656959301	0,703230368	0,496181442	0,745001939	0,664469581	1
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How frequently do you currently use AI-based tools or applications for your academic tasks?

0,18382699	0,395141938	5	0,62788826	0,601579944	0,728827014	0,509508993	0,593090813	0,662167363	0,749387212	1
------------	-------------	---	------------	-------------	-------------	-------------	-------------	-------------	-------------	---

To what extent has the availability of AI technology influenced your decision to adopt and integrate it into your academic routine?	0,1661173	0,393609341	0,59604428	0,713381536	0,704298762	0,62845931	0,57764765	0,671867991	0,730463893	0,79695676	6	1
How likely are you to explore and utilize new AI-based tools or applications in the future to enhance your learning and academic performance?	0,221955693	0,398107426	0,54424169	0,72676376	0,745256017	0,667530197	0,519442124	0,722300685	0,740460177	0,77444498	3	0,857974665

## ANOVA

SUMMARY					
Groups	Count	Sum	Average	Variance	
How concerned are you about potential ethical issues arising from the use of AI technology?	100	259	2,59	1,4968687	
To what extent do you believe that AI should be programmed with a strict set of ethical guidelines?	100	215	2,15	1,5025253	
How ethical do you think AI is?	100	349	3,49	1,020101	
How beneficial do you think AI technology can be for enhancing your studies and academic performance?	100	421	4,21	1,0362626	
To what extent do you believe AI can assist in personalized learning and adapting to individual learning styles?	100	412	4,12	0,7733333	
How likely do you think AI can provide valuable insights and recommendations to support your decision-making in academic pursuits?	100	402	4,02	0,9490909	
How confident are you in the ability of AI systems to safeguard your privacy and handle your personal data responsibly in an academic setting?	100	355	3,55	1,1994949	
To what extent do you believe that AI technology can effectively enhance the learning experience for university students?	100	418	4,18	0,7955556	
How comfortable are you with relying on AI-based tools or applications for academic tasks such as research, writing, or studying?	100	391	3,91	0,9312121	
How frequently do you currently use AI-based tools or applications for your academic tasks?	100	356	3,56	1,1579798	
To what extent has the availability of AI technology influenced your decision to adopt and integrate it into your academic routine?	100	383	3,83	0,9910101	
How likely are you to explore and utilize new AI-based tools or applications in the future to enhance your learning and academic performance?	100	385	3,85	0,9974747	

From the table above, it is seen that the variance of the answers to each question varies between 0.773 and 1,5. This indicates that for some questions like “To what extent do you

believe AI can assist in personalised learning and adapting to individual learning styles?” and “To what extent do you believe that AI technology can effectively enhance the learning experience for university students?” There is a higher level of consensus among the participants, reflected in lower variance values, while for other questions, there is more diversity or divergence of opinions, resulting in higher variances.

As for the average, "How beneficial do you think AI technology can be for enhancing your studies and academic performance?" which has the highest average value with an average of 4.21. This suggests that participants hold a strong belief in the value and advantages of AI technology for improving their learning experience and academic performance. The question with the second-highest average rating is "To what extent do you believe that AI technology can effectively enhance the learning experience for university students?" with an average of 4.18.

#### 4. Cronbach’s Alpha Validity and Reliability

In our quantitative research using questionnaires, we focused on four distinct constructs: the **ethicity of AI**, the **benefits of AI**, the **trust in AI**, and the **usage of AI**. Cronbach's alpha serves as a measure of internal consistency reliability in research and psychometric testing. Its purpose is to evaluate the degree of interrelatedness among a set of items or questions within a questionnaire or survey. Cronbach's alpha values range from 0 to 1, with higher values indicating stronger internal consistency.

##### a. Ethicality Construct

Reliability Statistics	
Cronbach's Alpha	N of Items
.617	3

Cronbach's alpha value is at 0.617, indicating a moderate level of internal consistency. With a cronbach’s alpha value of such, it shows that the data is considered acceptable to be used for research purposes, as it indicates that the items in the scale are moderately consistent. This consistency suggests that the measurements are accurate and that the items may measure the same characteristics.

#### **b. Benefit Construct**

Reliability Statistics	
Cronbach's Alpha	N of Items
.840	3

The Cronbach's alpha coefficient is 0.840, suggesting a high level of internal consistency. This value indicates a good level of internal consistency, as typically a Cronbach's alpha above 0.7 is considered acceptable in most research fields.

#### **c. Trust Construct**

Reliability Statistics	
Cronbach's Alpha	N of Items
.828	3

The Cronbach's alpha coefficient is 0.828, suggesting a high level of internal consistency. This value indicates a good level of internal consistency, as typically a Cronbach's alpha above 0.7 is considered acceptable in most research fields.

#### **d. Usage Construct**

Reliability Statistics	
Cronbach's Alpha	N of Items
.926	3

The Cronbach's alpha coefficient is 0.926, suggesting a very high level of internal consistency. A Cronbach's alpha of 0.926 is considered excellent and demonstrates a strong internal consistency and reliability. It implies that the items in the questionnaire are strongly correlated with each other, and respondents' answers to the items are consistently reflecting the underlying construct.



## 5. KMO & Bartlett

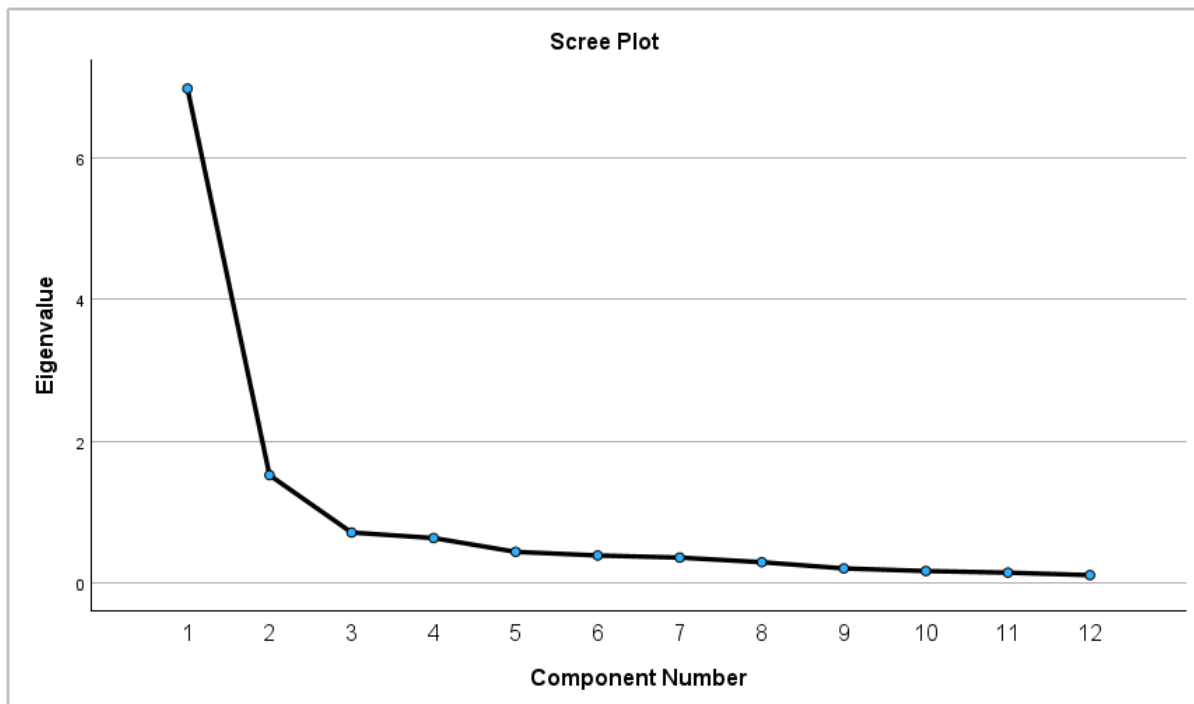
The KMO measure of sampling adequacy is 0.897, indicating that the data is highly suitable for conducting a factor analysis. Bartlett's test, which supports the use of factor analysis to uncover the underlying structure of the variables, reveals a significant relationship between the variables with a chi-square value of 920.407 and a highly significant p-value of less than 0.001..

KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			.897
Bartlett's Test of Sphericity	Approx. Chi-Square		920.407
	df		66
	Sig.		<.,001

These results demonstrate that the variables in our analysis are sufficiently connected to allow for factor analysis. The high KMO measurement shows that the data accurately reflect the relationships between the variables. The significant Bartlett's Test result also implies that the variables are related, allowing the use of factor analysis to identify trends in the data. The sig value is at less than 0.001 which means that the null hypothesis is rejected; further showing that the variables are correlated.

<b>Communalities</b>		
	Initial	Extraction
How concerned are you about potential ethical issues arising from the use of AI technology?	1.000	.825
To what extent do you believe that AI should be programmed with a strict set of ethical guidelines?	1.000	.791
How ethical do you think AI is?	1.000	.539
How beneficial do you think AI technology can be for enhancing your studies and academic performance?	1.000	.687
To what extent do you believe AI can assist in personalized learning and adapting to individual learning styles?	1.000	.754
How likely do you think AI can provide valuable insights and recommendations to support your decision-making in academic pursuits?	1.000	.550
How confident are you in the ability of AI systems to safeguard your privacy and handle your personal data responsibly in an academic setting?	1.000	.600
To what extent do you believe that AI technology can effectively enhance the learning experience for university students?	1.000	.650
How comfortable are you with relying on AI-based tools or applications for academic tasks such as research, writing, or studying?	1.000	.751
How frequently do you currently use AI-based tools or applications for your academic tasks?	1.000	.749
To what extent has the availability of AI technology influenced your decision to adopt and integrate it into your academic routine?	1.000	.798
How likely are you to explore and utilize new AI-based tools or applications in the future to enhance your learning and academic performance?	1.000	.810
Extraction Method: Principal Component Analysis.		

After the extraction, the communalities decrease, suggesting that the variance in all variables is explained by the extracted factors. Higher communalities indicate a greater amount of shared variance with the factors.



Based on the scree plot above, it is seen that component 1 has the highest eigenvalue, with component 12 being the lowest. This shows that component 1 can be considered the most significant. Generally, components with eigenvalues above the elbow are considered significant, as they represent dimensions or factors that contribute significantly to the variability in the observed variables.

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.978	58.150	58.150	6.978	58.150	58.150
2	1.525	12.711	70.861	1.525	12.711	70.861
3	.716	5.966	76.826			
4	.638	5.317	82.143			
5	.443	3.695	85.838			
6	.392	3.269	89.108			
7	.362	3.020	92.128			
8	.297	2.479	94.607			
9	.210	1.747	96.353			
10	.173	1.439	97.792			
11	.150	1.249	99.041			
12	.115	.959	100.000			

Extraction Method: Principal Component Analysis.

<b>Component Matrix<sup>a</sup></b>		
	Component	
	1	2
How concerned are you about potential ethical issues arising from the use of AI technology?	.239	.876
To what extent do you believe that AI should be programmed with a strict set of ethical guidelines?	.455	.764
How ethical do you think AI is?	.723	-.129
How beneficial do you think AI technology can be for enhancing your studies and academic performance?	.810	-.175
To what extent do you believe AI can assist in personalized learning and adapting to individual learning styles?	.864	-.080
How likely do you think AI can provide valuable insights and recommendations to support your decision-making in academic pursuits?	.742	.017
How confident are you in the ability of AI systems to safeguard your privacy and handle your personal data responsibly in an academic setting?	.719	-.288
To what extent do you believe that AI technology can effectively enhance the learning experience for university students?	.803	.074
How comfortable are you with relying on AI-based tools or applications for academic tasks such as research, writing, or studying?	.850	-.170
How frequently do you currently use AI-based tools or applications for your academic tasks?	.866	.001
To what extent has the availability of AI technology influenced your decision to adopt and integrate it into your academic routine?	.893	-.012
How likely are you to explore and utilize new AI-based tools or applications in the future to enhance your learning and academic performance?	.899	.041
Extraction Method: Principal Component Analysis.		
a. 2 components extracted.		

## 6. Regression

### Linear Regression Formula:

Dependent = alpha (or intercept) + AIBeneficial1 \* independent1 + AIEthical1 \* independent2 + AITrust1 \* independent3

AIusage = alpha (or intercept) + AIBeneficial1 \* independent1 + AIEthical1 \* independent2 + AITrust1 \* independent3

### 1: Regression (Ethical - Usage)

#### SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0,68482178
R Square	0,46898087
Adjusted R Square	0,45238652
Standard Error	0,79631988
Observations	100

R Square (also called the coefficient of determination) represents the proportion of the variance in the dependent variable that can be explained by the independent variables. The R Square value of 0.4689 suggests that about 46.9% of the variance in the dependent variable can be explained by the independent variables in the model. The multiple R value is relatively high at 0.684, indicating a moderate positive correlation between the variables. This R Square value suggests that the independent variables have a stronger influence on the dependent variable and that the model is able to explain and predict the variability in the dependent variable.

#### ANOVA

<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>

Regression	3	53,763967	17,9213223	28,2614825	3,48534E-13
Residual	96	60,876033	0,63412534		
Total	99	114,64			

The F-value for the regression model is 28,261, and the significance F value is 3,48534E-13. In this case, the significance F value is extremely small, which is less than the conventional threshold of 0.05. Since the significance F is smaller than F value, this demonstrates that the observed link between the independent variable and the dependent variable is not likely to be the result of chance. The SS for the regression component is 53.76396698, indicating the total variation explained by the predictors.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
Intercept	1,0637136	0,31666702	3,35909182	0,0011228	0,435134529	1,69229266	0,43513453	1,69229266
How concerned are you about potential ethical issues arising from the use of AI technology?	-0,0953906	0,084601579	-1,1275277	0,262329699	-0,26332342	0,0720072	-0,2633234	0,07254219
To what extent do you believe that AI should be programmed with a strict set of ethical guidelines?	0,2949253	0,085826629	3,43629126	0,00087304	0,124560783	0,46528981	0,12456078	0,46528981
How ethical do you think AI is?	0,6043721	0,081338	7,43035247	4,4688E-11	0,442916909	0,76582735	0,44291691	0,76582735

The coefficient of 0.604372129 for the "How ethical do you think AI is?" predictor suggests that, on average, a one-unit increase in the perception of AI ethicality is associated with a 0.604 increase in AI usage, holding other variables constant. The p-value associated with the "How ethical do you think AI is?" the predictor is 4.46882E-11, which is extremely small. This again suggests strong evidence against the null hypothesis of no relationship between AI ethicality and usage, therefore concluding that there is a statistically significant relationship between the independent variable of perceived AI ethicality and dependent variable AI usage.

## 2: Regression (Beneficial - Usage)

## SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0,744454437
R Square	0,55421241
Adjusted R Square	0,540281547
Standard Error	0,729619545
Observations	100

In this case, the multiple R is approximately 0.744454437, indicating a strong positive correlation. In addition to that the R square value is approximately 0.55421241, which means that about 55.42% of the variance in the dependent variable can be accounted for by the independent variables. The standard error of approximately 0.729 indicates the average amount of error in the predicted values of the dependent variable. Overall, the R square and multiple R value suggest that the independent variable (AI perceived benefits) have some predictive power in explaining the changes in the dependent variable (AI usage).

## ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	63,5349106	21,1783035	39,7830659	8,5104E-17
Residual	96	51,1050894	0,53234468		
Total	99	114,64			

From the ANOVA test, we can draw the conclusion that the independent variable(accessible) and dependent(ethical) variable have a statistically significant relationship, as the significance F is smaller than the F value. The significance F, or the p-value associated with the F-statistic, is 8.51037E-17. As this value represents the probability of observing a result as extreme as the one obtained, assuming that there is no relationship between the independent and dependent variables in the population, the result being very small supports the conclusion that there is a link between the two variables.

				Lowe Uppe			
				Lowe Uppe		r	
				Standard		r	
				r		95,0	
				Coefficients		Error	
				t Stat		P-value	
				95%		95%	
				%		%	
Intercept				-1,07	0,40	-1,07	0,402
				0,373222	-0,906	0,3671	9040
				-0,33819886	87	1579	2105
						4	68
						4	8
How beneficial do you think AI technology can be for enhancing your studies and academic performance?				0,01	0,41	0,011	0,416
				0,102084	2,0971	0,0386	1447
				0,214083799	72	1892	1124
						23	37
						3	7
To what extent do you believe AI can assist in personalized learning and adapting to individual learning styles?				0,47	0,96	0,476	0,964
				0,122996	5,8568	6,594E-	6223
				0,720369188	45	2917	08
						17	21
						7	1
How likely do you think AI can provide valuable insights and recommendations to support your decision-making in academic pursuits?						0,21	0,212
				0,103552	0,0696	0,9446	-0,19
				0,007210202	54	2844	3423
						834	37
						834	7

The variable "How beneficial do you think AI technology can be for enhancing your studies and academic performance?" has a coefficient of 0.214083799, pointing to a positive impact. This variable's t-statistic is 2.097118921, and its p-value is 0.038611238. These findings point to a statistically significant association, indicating that the dependent variable rises as the impression in AI's advantages rises.

The variable "To what extent do you believe AI can assist in personalized learning and adapting to individual learning styles?" shows a substantial positive association, as shown by its coefficient of 0.720369188, a t-statistic of 5.856829166, and an extremely low p-value of 6.59396E-08. By contrast, the variable "How likely do you think AI can provide valuable insights and recommendations to support your decision-making in academic pursuits?" does not show a statistically significant relationship, as evidenced by its low p-value of 0.944634232, low t-statistic of 0.069628441, and high coefficient of 0.007210202.



In conclusion, it can be concluded that the overall variable "AI perceived benefits" is statistically significant in its relationship with the dependent variable of "AI usage". This is backed by the "How beneficial do you think AI technology can be for enhancing your studies and academic performance?" variable's coefficient of 0.214083799, t-statistic of 2.097118921, and p-value of 0.038611238. These numbers show a correlation between the use of AI and the benefits that are believed to exist. Based on the statistical data, we can thus draw the conclusion that there is a significant correlation between the perceived advantages of AI technology and its usage in the context of boosting academic achievement.

### 3: Regression (Trust - Usage)

#### SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0,78403606
R Square	0,61471254
Adjusted R Square	0,60267231
Standard Error	0,67830483
Observations	100

The regression analysis conducted on the relationship between the independent variable "Trust" and the dependent variable "Usage" reveals the following results; R square value stands at 0.61471254, indicating that roughly 61.47% of the variability in AI usage can be accounted for by trust in AI. Apart from that, The multiple R value of 0.78403606 indicates a moderately strong positive relationship between trust in AI and AI usage. The statistically significant regression statistics and relatively high R-squared value further support the conclusion that trust in AI plays a significant role in influencing the extent of AI usage.

#### ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	70,4706457	23,4902152	51,0548704	8,1509E-20

Residual	96	44,1693543	0,46009744
Total	99	114,64	

In this case, the significance level is extremely low at 8.1509E-20, suggesting a highly significant relationship between the independent variables and the dependent variable. In this particular analysis the high F-statistic value of 51.0548704, shows that there is a substantial association between the independent variables (predictors) and the dependent variable, as a high F-stat value suggests that the variability explained by the regression model is significantly greater than the unexplained variability, this is also supported by the SS value of 70,47 which is relatively high, indicating a stronger relationship between trust in AI (independent) and AI usage (dependent).

		<i>Standard</i>			<i>Lower</i>	<i>Upper</i>	<i>Lower</i>	<i>Upper</i>
	<i>Coefficients</i>	<i>Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>95%</i>	<i>95%</i>	<i>95,0%</i>	<i>95,0%</i>
Intercept	-0,3792073	0,3396586	-1,11643	0,26702	-1,053	0,2950	-1,053	0,295
How confident are you in the ability of AI systems to safeguard your privacy and handle your personal data responsibly in an academic setting?	0,10280281	0,09360018	1,09831	0,27481	-0,082	0,2885	-0,082	0,288
To what extent do you believe that AI technology can effectively enhance the learning experience for university students?	0,36358531	0,10258956	3,54407	0,00061	0,1599	0,5672	0,159	0,567
How comfortable are you with relying on AI-based tools or applications for academic tasks such as research, writing, or studying?	0,52544008	0,12651056	4,15332	7,1045E-05	0,2743	0,7765	0,274	0,776

In response to the inquiry "How confident are you that AI systems will be able to protect your privacy and handle your personal data responsibly in an academic setting?" and "To what extent do you believe that AI technology can effectively enhance the learning experience for university students?" The correlation coefficients are 0.102802812 and 0.363585308, respectively. On the basis of their t-statistics and p-values, both variables in this instance, however, are determined to be not statistically significant. The third question, in contrast, is proven to be statistically significant, exhibits a coefficient of 0.525440076, and the low p-value of 7.10449E-05 suggests that the probability of observing such a strong relationship

by chance alone is very low. As a result, it can be concluded that there is strong evidence to support the claim that a higher level of comfort in using AI-based tools (trust in AI) is associated with a significant increase in the dependent variable.

Overall, only one of the independent variable's questions is proven to have a statistically significant relationship with the dependent variable. This may be due to the fact that the question "How confident are you that AI systems will be able to protect your privacy and handle your personal data responsibly in an academic setting?" asks whether respondents think AI can protect their privacy, and respondents might not be confident in it but still uses AI, therefore making the relationship not statistically significant. As for the second question in this variable "To what extent do you believe that AI technology can effectively enhance the learning experience for university students?" respondents may believe that it can enhance the learning experience but do not use it oftenly due to other factors like the perceived ethicality, as seen in the descriptive statistics that the mean of this answer is high at 4.18. This shows that there are other factors that are more significant than whether respondents think that AI can enhance their learning experience that links towards their usage of AI.

#### 4: Multiple Regression

AIethical = alpha (or intercept) + AIbeneficial1 \* independent1 + AIaccessible1 \* independent2 + AIusage1 \* independent3

#### SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0,87503951
R Square	0,76569414
Adjusted R Square	0,75837208
Standard Error	0,46990592
Observations	100

Based on the table above, it is seen that there is a strong positive linear relationship between the independent variables and the dependent variable, as shown by the multiple R value of 0,875. In addition to that, The R squared value of 0.76569414 indicates that around 76.57% of the variation in the dependent variable can be attributed to the independent variables. An improved indicator of the model's goodness of fit is shown by the adjusted R-squared value of 0.758372082, which takes into account the number of predictors and shows that, when the complexity of the model is taken into account, the independent variables account for about 75.84% of the variance in the dependent variable, which is a high value.

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	69,2731996	23,0910665	104,573622	3,8852E-30
Residual	96	21,1979115	0,22081158		
Total	99	90,4711111			

The sum of squares (SS) of 69.27319961, indicating the variability in the dependent variable that is explained by the independent variables. High statistical significance can be shown from the incredibly small p-value (3.88521E-30) correlated with the significance F value. The regression model is clearly very significant because this implies a strong link between the independent factors and the dependent variable. With a low p-value and a high F value (104.5736221), it indicates a more significant relationship between the independent variables and the dependent variable.

	Standard				Lower	Upper	Lower	Upper
	Coefficients	Error	t Stat	P-value	95%	95%	95,0%	95,0%
Intercept			-2,125842	0,0360823	-1,015651	-0,034801		
	-0,5252265	0,247067461	6	5	6	5	-1,0156516	-0,0348015
MEAN			2,7547360	0,0070277	0,0490691	0,3021416	0,0490691	0,3021416
ETHICAL	0,17560539	0,06374672	3	3	5	3	5	3
			5,0126145	2,4504E-0	0,2840976	0,6566197	0,2840976	0,6566197
MEAN BENEFIT	0,4703587	0,093835002	8	6	9	1	9	1

MEAN		5,3383550	6,2694E-0	0,6546258	0,6546258
CONFIDENT	0,47719013	0,089388982	9	7	0,2997544 6

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*\*\*Mean ethical, Mean Benefit, Mean Confident takes the average of the responses of all three questions in each construct.*

To start off, the intercept, which represents the expected change in the dependent variable when all independent variables are set to zero, has a coefficient of -0.525226527. The intercept is statistically significant at a standard significance level, as shown by the t-statistic of -2.125842568 and the corresponding p-value of 0.036082352, indicating that it has a meaningful impact on the dependent variable.

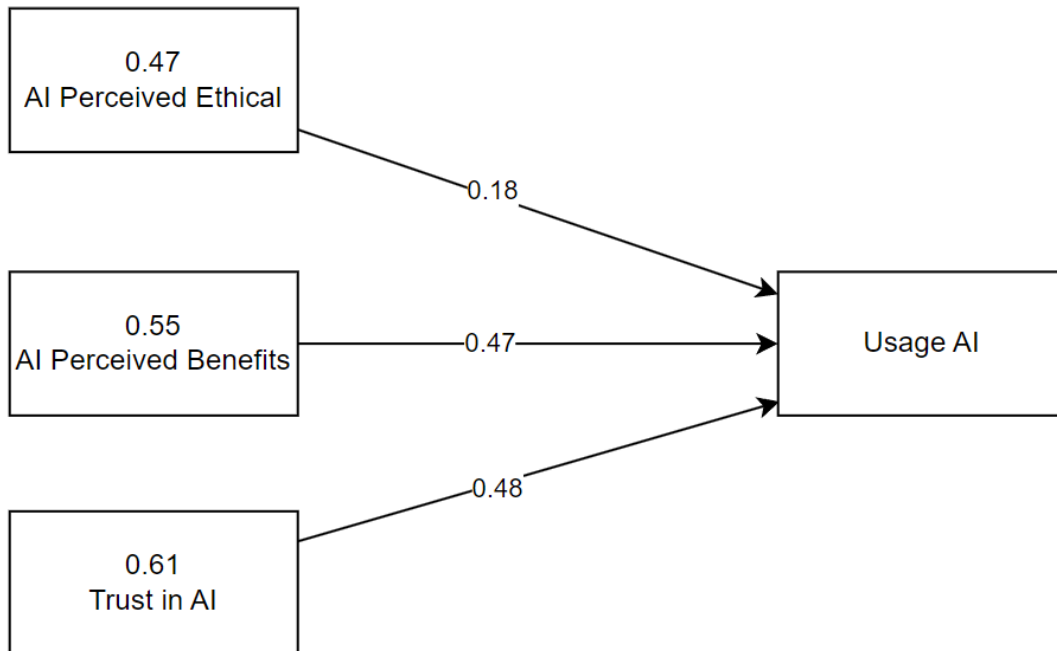
The coefficient for "Mean Ethical" is 0,175605387, indicating the expected change in the dependent variable for each unit increase in "Mean Ethical." The t-statistic of 2.754736031 and the p-value of 0.007027733 demonstrate the statistical significance of this variable, suggesting that higher ethical perceptions correspond to a significant increase in the dependent variable.

Similar to the previous variable, the variable "Mean Benefit" has a coefficient of 0.470358699, showing the expected change in the dependent variable for each unit increase in "Mean Benefit." The strong statistical significance of this variable is indicated by the t-statistic of 5.01261458 and the extremely low p-value of 2.45043E-06, suggesting that a higher perception of AI benefits is linked to a considerable increase in the dependent variable AI usage.

The "Mean Confident" variable also shows a coefficient of 0.477190128, which is the anticipated change in the dependent variable with each unit increase in "Mean Confident." With a t-statistic of 5.33835509 and an remarkably small p-value of 6.26937E-07, this variable is proven to be statistically significant, suggesting a strong and significant correlation between higher confidence levels in AI and an increase in the AI usage.

### Research Model after Data Analysis

After analysing the data, it is found that all three independent variables (AI ethical, AI beneficial, AI trust) were found to have a statistically significant effect on the usage of AI as shown with the revised research model including the beta scores and the R-Square.



### XIII. Comparison of Qualitative and Quantitative Results

The survey includes both qualitative and quantitative questions. In getting the qualitative data, we asked several questions including “Based on your answers, please briefly explain the reasons behind your view on AI’s ethicality”, “In what specific ways do you believe AI-based tools or applications have benefited your academic studies or enhanced your learning experience? Please provide examples if possible.”, “What factors or experiences would make you feel more confident and comfortable relying on AI-based tools or applications for your academic tasks?”, and “Can you describe how the ethical considerations, perceived benefits, and trust in AI systems have influenced your decision to use AI-based tools or applications in your academic studies?”. We created these questions in

order to see the reasoning behind the quantitative question's responses, and to see any factors that are related to the independent variable. The last question asked the respondents to describe how the three independent variables have influenced their usage of AI, and this question aims to get to see the respondents link the independent variable towards the dependent variable.

In the question "Can you describe how the ethical considerations, perceived benefits, and trust in AI systems have influenced your decision to use AI-based tools or applications in your academic studies?" responses include "The incorporation of AI tools into my academic studies has been influenced by ethical considerations, the benefits I expect them to bring, and the trust I have in AI systems. I want to ensure that my use of AI is responsible and beneficial.", "though i think that it's ethical to a certain extent, the benefits it provides for students outweighs the ethical considerations, and this influence how often i use AI", a lot of the responses revolve around saying the the higher the benefits of using AI is, the more likely the respondents are to use it often. Apart from that, many also consider trust as a significant factor, claiming that users need to know if their data is safe, and if so then they will have trust in the AI and hence influences their usage of AI. The responses to this questions supports the quantitative data that the independent variables (ethical considerations, perceived benefits, trust) affect the dependent variable (usage of AI), as seen that the respondents say that if there is higher perceived benefits, ethicality or trust, then it plays a significant role in how much they use AI. This is evidenced in the quantitative data correlation.

When asked "What factors or experiences would make you feel more confident and comfortable relying on AI-based tools or applications for your academic tasks?", a pattern is seen on the responses, which is feedback from friends (positive user experience) and a clear

explanation of data usage and privacy measures. Positive user experience feedback is mentioned more than 10 times, showing that there is some agreement among respondents that a positive feedback would make them feel more confident in using AI. This complements the quantitative data as this helps show why some respondents may not rank their trust in AI as high.

Overall, the qualitative data collected from the survey supports the correlation and the overall quantitative data. No outliers on the qualitative data is found, as most of the questions lean towards asking the reason behind their answer for the quantitative questions.

#### **XIV. Conclusion**

Based on the data, it can be derived that AI is perceived as quite ethical, highly beneficial and somewhat trusted by university students. With AI being beneficial having the highest mean, this indicates that most respondents are more likely to think that AI is beneficial. Overall, AI is perceived as being trusted as it has a high mean value, AI being ethical has the lowest mean, concluding that some people are uncertain on their thoughts of whether AI is ethical. The data shows that perceived ethicality, benefits, and trust in AI has a statistically significant relationship on AI usage.

In conclusion, based on the data analysis, the following hypothesis:

1. Higher perception of the ethicality of AI for university students will be positively correlated with higher perceived AI usage.
2. Higher perception of benefits of AI will be positively correlated with higher AI usage.
3. Higher trust in using AI will be positively correlated with higher AI usage.



4. The AI usage will be somewhat influenced by the perceived levels of AI ethicality, trust and benefits for university students.

Is proven to be true, this is evidenced by the correlation between the independent variables (perceived ethicality, benefits, trust) that has a statistically significant effect on the dependent variable usage of AI. Thus, it can be concluded that the hypothesis regarding the influence of the three independent variables on the dependent variable is supported. The findings indicate that perceived ethicality, benefits, and trust have a meaningful impact on individuals' usage of AI. This conclusion is based on statistical analysis, which establishes a clear relationship between the independent and dependent variables. The results suggest that when individuals perceive AI as ethically sound, beneficial, and they trust the AI, they are more likely to engage in its usage.

Hypothesis 1: The hypothesis that the perception of AI ethicality for university students being positively correlated with higher AI usage has proven to be statistically significant. This is shown by the positive correlation of 0,54, showing that it has a moderate positive correlation.

Hypothesis 2: The higher perception of the benefits of AI being positively correlated with higher AI usage has a correlation of 0,81 and is proven to be statistically significant towards the dependent variable AI ethicality, the correlation number itself shows a strong positive relationship.

Hypothesis 3: The higher trust/confidence in using AI being positively correlated with higher AI usage has a correlation of 0.81 as well, showing a strong positive relationship.

Hypothesis 4: This hypothesis is proven true as all the independent variables have shown that it has an impact towards the dependent variable and that their relationship is not due to chance.

This research report focused on the ethicality, perceived benefits, and trust in AI for university students in its analysis of perceptions of AI in education. According to the study's findings, which were based on a poll of 100 respondents, perceived benefits of AI, trust in AI and perceived AI ethicality are statistically shown to be significant in their AI usage.

## **XV. Recommendations**

Data were gathered for the research study in question using an approach that mostly included broad inquiries and a small number of focused inquiries. Although this method gives a basic comprehension of the topic, there is still plenty of potential for further investigation by using more thorough and focused data collecting techniques. Researchers might get a more in-depth grasp of the subject under study by broadening the breadth and depth of their data collecting.

Future researchers may think about using a variety of techniques to gather more comprehensive and thorough data in order to achieve this. In-depth interviews or focus groups with relevant stakeholders, such as teachers, students, administrators, and AI developers, might be conducted as one strategy. These open-ended talks are made possible by these qualitative methodologies, enabling participants to elaborate on their experiences, viewpoints, and ideas. The depth of the information gathered using these techniques can give important insights into the particular difficulties, advantages, and ethical issues related to the application of artificial intelligence in educational activity.

Future researchers may use quantitative techniques in addition to qualitative ones to collect larger and statistically meaningful amounts of data. Well-designed and verified scales in surveys and questionnaires can help them gather a greater range of data from a bigger

sample size. These tools may be customised to evaluate different aspects of accessibility, advantages, and ethical issues relating to the use of AI in educational contexts. These quantitative methodologies allow for a more thorough investigation of the study issue by carefully analysing and quantifying the prevalence and importance of many aspects.

Future researchers should also think about merging qualitative and quantitative data gathering techniques to create mixed-methods approaches. By triangulating several data sources and capturing both the breadth and depth of the study issue, this integration can offer a thorough insight. For instance, qualitative information gleaned from focus groups or interviews may contextualise and enhance the quantitative information gleaned through surveys, providing a more complete picture of the issue.

Future researchers could concentrate on broadening their sample in order to guarantee the acquisition of more comprehensive data. Researchers can obtain a more complete picture of how AI is used, its impact, and potential variations in accessibility and ethical considerations across different educational settings by including participants from a variety of educational contexts, such as different grade levels, school types, or geographical regions.

## XVI. References

- Aldosari, S. A. M. (2020). The Future of Higher Education in the Light of Artificial Intelligence Transformations. *International Journal of Higher Education*, 9(3), 145. <https://doi.org/10.5430/ijhe.v9n3p145>
- Humble, N., & Mozelius, P. (2022, November). *The threat, hype, and promise of artificial intelligence in education*. ResearchGate; unknown. [https://www.researchgate.net/publication/365301235\\_The\\_threat\\_hype\\_and\\_promise\\_of\\_artificial\\_intelligence\\_in\\_education](https://www.researchgate.net/publication/365301235_The_threat_hype_and_promise_of_artificial_intelligence_in_education)
- IBM. (n.d.). *Natural Language Processing (NLP)*. <https://www.ibm.com/id-en/topics/natural-language-processing>
- Jantakun, T., Jantakun, K., & Jantakoon, T. (2021). A Common Framework for Artificial Intelligence in Higher Education (AAI-HE Model). *International Education Studies*, 14(11), 94. <https://doi.org/10.5539/ies.v14n11p94>
- Keleş, P. U., & Aydın, S. (2021). University Students' Perceptions About Artificial Intelligence. *Shanlax International Journal of Education*, 9(S1-May), 212–220. <https://doi.org/10.34293/education.v9is1-may.4014>
- Mcdaniel, R., & Armstrong, P. A. (2010). *Bloom's Taxonomy*. Vanderbilt University. <https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/>
- OECD. (n.d.). *The OECD Artificial Intelligence (AI) Principles - OECD.AI*. <https://oecd.ai/en/ai-principles>
- Teaching & Learning Principles*. (2019, February 11). Dartmouth Center for the Advancement of Learning. <https://dcal.dartmouth.edu/resources/teaching-learning-foundations/teaching-learning-principles>
- Venkata Subrahmanyam Vampugani, & Kailasam Swathi. (2018, August 11). *Artificial*

*Intelligence and its Implications in Education*. ResearchGate; unknown.

[https://www.researchgate.net/publication/328686410\\_Artificial\\_Intelligence\\_and\\_its\\_Implications\\_in\\_Education](https://www.researchgate.net/publication/328686410_Artificial_Intelligence_and_its_Implications_in_Education)

Western Governors University. (2021, May 27). *Connectivism Learning Theory*.

<https://www.wgu.edu/blog/connectivism-learning-theory2105.html>

*What is Machine Learning?* | IBM. (n.d.). <https://www.ibm.com/topics/machine-learning>