



RESEARCH ARTICLE

Perception of Use of Ai Tools Among Students of Higher Education Institutes in Mumbai

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ABSTRACT

Artificial intelligence (AI) is the ability of a sophisticated computer system tool to perform tasks that often require human intelligence. This study aims to investigate students' perceptions on artificial intelligence in Mumbai's higher education institutions.

To gather quantitative data, a questionnaire was created and many of the questions used a Likert scale ranging from 1 to 5. A judgment sampling technique is used to select a sample of 604 students. The questionnaire was administered and the required data was gathered using the question-based survey technique. The target segment is graduate and post graduate students from different colleges of Mumbai

Six colleges offering courses like management, science, commerce, and arts were selected based on judgment sampling from the city of Mumbai. From each college, about 100 students belonging to different courses were selected using stratified random sampling, so that the overall sample size is 604.

These students were given a questionnaire to find out their perception of AI tools and their merits and demerits. The questionnaire was administered through google forms to the students.

Keywords: *students, AI, perception, higher education institutes, Mumbai*

INTRODUCTION

Artificial intelligence (AI) is the ability of a sophisticated computer system tool to perform tasks that often require human intelligence. Essentially, the term "artificial intelligence" was coined in 1956 by American computer scientist John McCarthy (Russell & Norvig, 2010, p. 17). Modern applications and technology are advancing artificial intelligence, and new features are being added daily. Originally, artificial intelligence was developed for applications in fields like mathematics, expert systems, and games. In 1950, artificial intelligence was used for the first time when a program was developed that could play chess and checkers. But since then, artificial intelligence applications have expanded to several industries and companies, including manufacturing, healthcare, finance, entertainment, and transportation.

1.1 Perception of Artificial Intelligence:

Diverse and opposing opinions exist about the application, efficacy, safety, privacy, and ethical standards of AI.

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First, AI increases efficiency. Many people think AI is a good tool for automation, productivity gains, and streamlining operations in a variety of industries, which leads to more efficiency and lower costs. Additionally, a lot of people considered artificial intelligence to be the pioneer in this subject as it revolutionized the healthcare sector.

Second, many people think artificial intelligence is an essential tool for companies in the service industry since it enhances the client experience. However, in the current marketing period, AI is showing tremendous benefits in the retail, hotel, and entertainment sectors.

The future of higher education is closely linked to the development of new technologies and the processing capacity of the new intelligent machines. Advances in artificial intelligence have the potential to fundamentally change the internal structure and administration of higher education institutions, posing both new challenges and opportunities for teaching and learning.

Thus, artificial intelligence (AI) refers to computer systems that are capable of learning, adapting, synthesizing, self-correcting, and employing data for complex processing tasks—all of which are human-like abilities. The nature of services offered by higher education is already being significantly impacted by the quick development of artificial intelligence.

An early example of artificial intelligence is IBM's Watson supercomputer, which is now in use in educational institutions. Every day of the year, Deakin University students in Australia can get advice from this solution at any time of day. Even though Watson's use is based on algorithms that are suitable for doing repetitive and somewhat predictable tasks, it is an example of how artificial intelligence (AI) will impact the administrative workforce profile in higher education in the future. This is changing the time dynamics at the university, the composition of the workforce, and the calibre of services offered.

Basic research is needed to develop effective methods for human-AI collaboration and communication (U.S. National Science and Technology Council 2016). Even while we see that significant developments in machine learning and artificial intelligence bring new potential and challenges for higher education, it is important to keep in mind that education is essentially a human-centric endeavour rather than a technology-centric solution.

According to Popenici and Kerr's (2017) *Research and Practice in Technology-Enhanced Learning*, technology should be utilized to enhance human cognition and the educational process rather than being limited to a collection of procedures for material distribution, control, and assessment.

1.2. The rise of artificial intelligence and augmentation in higher education:

The introduction and uptake of new technologies in teaching and learning has advanced significantly during the last three decades. Looking at things through the current lens makes it easy to overlook the fights that have raged in our institutions about enabling kids to use what are now considered elementary technology. Technology such as search engines, zoom features, predictive text, text-to-speech, speech-to-text, spell checks, and more were initially developed to assist people with impairments. These technological solutions were later expanded in use and are now commonplace in all personal computers, wearables, and handheld devices. These technologies are being used by all students worldwide to improve their learning relationships, increasing the possibilities for instruction and the creation of educational experiences.

Furthermore, from home appliances and public transit to smartphone features and apps and Internet search engines, artificial intelligence (AI) is currently enhancing the tools and instruments that are used daily in cities and campuses throughout the world.

1.3. Significance of the study:

This study aims to investigate students' perceptions on artificial intelligence in Mumbai's higher education institutions. Its objective is to assess how well AI tools can be integrated into the classroom to enhance learning from the perspective of the students. We also aim to examine the impact of AI tools on students' critical and creative thinking skills. We want to know what students think about and have experienced with AI tools. We want to know how students perceive the impact of AI tools on their productivity. Additionally, we are interested in the students' opinions regarding the benefits and drawbacks of employing AI tools. The study also seeks to find out what recommendations students have for making efficient use of AI tools.

2. Review of Literature

"AI involves computer software programmed to interact with the world in ways that normally require human intelligence," according to Luckin et al. (2016) (p. 18). The ability of computers to employ algorithms, learn from data, and apply what they learn to make decisions just like a human would is also described by Rouhiainen (2018) (p. 17).

AI is used in education to create personalized, flexible, inclusive, and engaging learning environments (Luckin et al., 2016, p. 30). This means that it tries to adapt the structure, difficulty level, order, and speed of educational materials, along with their dialogues, questions, and feedback, to each learner's unique needs (Jara & Ochoa, 2020, p. 8). In order to provide individualized learning, it is utilized

to modify the educational process to meet the unique requirements of every student. The use of AI in higher education presents both potential and difficulties. According to López et al. (2023, p. 122), these technologies allow for the customization of the learning process and the creation of virtual settings that mimic actual circumstances (Alvites Huamaní, 2019, p. 17).

According to Castillejos López (2022), there is a possibility that students' active approach will decrease. Thus, incorporating AI requires finding a balance between harnessing its potential and considering its ethical and pedagogical implications for students' self-directed learning.

Therefore, this review of the literature aids in our comprehension of artificial intelligence and how it can both enhance and restrict students' abilities.

Shaikh Hajimalag Akabar (2024) in his study "Perception of Artificial Intelligence among Post Graduate Students in Maharashtra, India," investigates how postgraduate students in Maharashtra view artificial intelligence.

Gertrudis Amarilis Lainez Quinde et al. (2024) in their study "PERCEPTION OF UNIVERSITY STUDENTS ON THE USE OF ARTIFICIAL INTELLIGENCE (AI) TOOLS FOR THE DEVELOPMENT OF AUTONOMOUS LEARNING," attempt to investigate how university students view the application of AI tools for the advancement of autonomous learning.

Odin Monrad Schei et al. (2024) in their study "Perceptions and Use of AI Chatbots among Students in Higher Education: A Scoping Review of Empirical Studies," clarify that since publicly accessible AI chatbots such as ChatGPT, Copilot, Gemini, and Claude have recently become available, information regarding how students in higher education view and utilize these tools is needed.

Cecilia Ka Yuk Chan and Wenjie Hu (2023) in their study "Students' voices on generative AI: perceptions, benefits, and challenges in higher education," examine how college students view generative AI (GenAI) tools like ChatGPT in the context of higher education, paying particular attention to familiarity, engagement, possible advantages and disadvantages, and successful integration.

Anna Nikoulina and Anna Caroni (2024) in their study "Familiarity, Use, and Perception of AI-Powered Tools in Higher Education," describe how the use of AI-powered tools in teaching and learning has increased dramatically.

Abbasi Mohsen et al. (2023) in their study, "Artificial Intelligence: A look back to the future in University Education," explain that although artificial intelligence made significant strides in 2023, the education community was not always ready for the introduction and use of new software like ChatGPT,

Adobe Generative Fill, Stable Diffusion, and others. Prathamesh P. Churi et al. (2023) in their paper "Artificial Intelligence in Higher Education," describe how the widespread use of technology in education is changing how we instruct and learn. One of the innovative ways to tailor the experiences of various learning groups, instructors, and tutors is artificial intelligence.

Ashley Abramson (2023) in his research "Artificial Intelligence in Higher Education," demonstrates that, with a few exceptions, artificial intelligence can assist students get ready for the real world by promoting critical thinking rather than degrading their effort.

Maya Katenova and Karlygash Turmaganbetova (2024) in their study "Artificial Intelligence and Business School Students' Performance," seek to determine whether artificial intelligence and business school students' performance are related.

Prajakta Shelar and Krishna Nikumbh (2023) in their study "Assessing Awareness and Perceptions: Mumbai University Undergraduate Students' knowledge of AI Tools in Statistical and Mathematical Understanding Skills," examine undergraduate students' awareness and perceptions of the integration of AI tools in the development of statistical and mathematical understanding skills.

Khare Aaditya & Dixit Nishka (2023) in their study "A Study on CHATGPT and its impact on the higher education system in Mumbai," seek to assess how professors and students feel about switching to ChatGPT/AI from the conventional teaching and learning methods.

The artificial intelligence (AI) chatbot ChatGPT has caused a stir in the educational community, according to Civil, B. (2023) in his study "ChatGPT can hinder students' critical thinking skills: Artificial intelligence is changing how students learn to write." Enkelejda Kasneci et al. (2023) in their study "ChatGPT for Good? On Opportunities and Challenges of Large Language Models for Education," clarify that large language models are a noteworthy development in the field of artificial intelligence.

Honey Mae A. Herminigildo et al. (2023) in their study "College Students' View on Using Artificial Intelligence in Research: A Friend or a Foe?" argues that the use of AI to academic research marks a turning point in the development of higher education. Baidoo-Anu, D., and Owusu Ansah, L. (2023) in their study "Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning," list several possible advantages and disadvantages of ChatGPT in fostering teaching and learning.

Alammar, A., & Amin, E.A. (2023) in their study "EFL Students' Perception of Using AI Paraphrasing

Tools in English Language Research Projects," clarify that researchers and educators hold varying views regarding the application of AI-driven automated paraphrase tools (APTs).

According to Koraishi, O. (2023), in his study "Teaching English in the Age of AI: Embracing ChatGPT to Optimize EFL Materials and Assessment," the abrupt rise of artificial intelligence (AI) technologies has had and is still having a revolutionary effect on a number of fields, including education.

Pavlik John V. (2023) in his study "Collaborating with ChatGPT: Considering the Implications of Generative Artificial Intelligence for Journalism and Media Education," explains how generative artificial intelligence (AI) is bringing about a period of potential change in media content and journalism.

Regie Boy B. Fabro et al. (2024) in their study "Perceptions and Extent of Utilization of Generative Artificial Intelligence (AI) among Filipino Students," investigate how Filipino students view and apply generative AI in academic writing.

Based on experience gathered by universities around the world, Halyna Lukianets & Tetiana Lukianets (2023) discuss potential real-world uses of artificial intelligence in higher education from the viewpoints of both staff and students.

Crompton, H., and Burke, D. (2023) in their study "Artificial intelligence in higher education: the state of the field," indicate that this systematic review offers original findings with a current analysis of artificial intelligence.

Guirrou Hamza, Mohamed Zeriab Es-sadek, and Youssef Taher (2023) in their study "Artificial Intelligence in Self-Driving: Study of Advanced Current Applications," examine the developments of artificial intelligence (AI) in the field of self-driving technology.

3. Research Design

3.1 Aim of the study: The aim of the study is to examine the perception of artificial intelligence tools among the students of higher education institutes in Mumbai.

3.2 Objectives of the study:

1. To understand, from the viewpoint of the students, how well AI tools may be incorporated into higher education to improve learning.
2. To understand how AI tools might help students in higher education develop their critical thinking and creative skills.
3. To understand how students perceive AI tools affecting their ability to be productive.
4. To learn how students view the advantages and disadvantages of utilizing AI tools.

3.3: Hypothesis

1. H₀: Students feel that AI tools have not significantly improved their learning and the efficiency of academic work

H₁: Students feel that AI tools have significantly improved their learning and the efficiency of academic work

2. H₀: Students feel that AI tools do not have a significant effect on their problem-solving skills

H₁: Students feel that AI tools have a significant effect on their problem-solving skills

3.4: Methodology and Method

To gather quantitative data, a questionnaire was created and many of the questions used a Likert scale ranging from 1 to 5. A judgment sampling technique is used to select a sample of **604** students. The questionnaire was administered and the required data was gathered using the question-based survey technique. The target segment is graduate and post graduate students from different colleges of Mumbai

3.5 Sampling design: Six colleges offering courses like management, science, commerce, and arts were selected based on judgment sampling from the city of Mumbai. From each college, about 100 students belonging to different courses were selected using stratified random sampling, so that the overall **sample size is 604.**

These students were given a questionnaire to find out their perception of AI tools and their merits and demerits. The questionnaire was administered through google forms to the students.

4. Findings

- 93.5% of the respondents are college students.
- 86.3% of the respondents are in the age group of 18-24 years and the remaining are above 24 years of age.
- 52% of the respondents are females and the remaining 48% are males.
- 47.5% of the respondents are commerce students, 28.5% are arts students, 17.1% are science students and the remaining are diploma and certificate course students.
- 78.1% of the respondents use AI tools for educational purpose regularly, 21% use AI tools sometimes and the remaining 0.9% students do not use AI tools for educational purpose.
- 98% of the respondents use ChatGPT or other AI language, 45.2% use Grammarly or other writing assistants, 37.1% use AI based plagiarism checkers, 17.5% use AI for data analysis and visualization, 15.9% use virtual learning environments, 8.9% use AI driven research databases, 6.8% use AI powered learning

- management systems, 2.8% use project management tools and 6.1% use other AI tools.
- 45.2% respondents use AI tools for academic purposes daily, 34.6% use them weekly, 8.8% use them monthly, 10.9% use them rarely and the remaining 0.5% never use them.
 - 20% respondents strongly agree that AI tools significantly improved their learning in academic work, 59.3% agree that AI tools significantly improved their learning in academic work, 14.9% are neutral about the statement that AI tools significantly improved their learning in academic work, 4% respondents disagree with this statement and 1.8% strongly disagree with this statement.
 - 27.2% respondents strongly agree with the statement that AI tools play a supporting role for learning outcomes and academic success, 52.8% agree with this statement, 14.9% show a neutral response towards this statement, 3.6% disagree with this statement and 1.5% strongly disagree with this statement.
 - 34.3% respondents strongly agree with the statement that AI tools help to better understand complex concepts or solve difficult academic problems, 47.4% agree with this statement, 12.4% show a neutral response towards this statement, 4.6% disagree with this statement and 1.3% strongly disagree with this statement.
 - 30.6% respondents strongly agree with the statement that AI tools assist in personalized learning and improving engagement, 49% agree with this statement, 13.6% show a neutral response towards this statement, 5.8% disagree with this statement and 1% strongly disagree with this statement.
 - 47.4% strongly agree with the statement that AI tools help to complete assignments or projects more efficiently, 35.6% agree with this statement, 10.9% show a neutral response towards this statement, 4.1% disagree with this statement and 2% strongly disagree with this statement.
 - 30.3% respondents strongly agree with the statement that AI tools increased the overall quality of work, 51.2% agree with this statement, 12.7% show a neutral response towards this statement, 3.5% disagree with this statement and 2.3% strongly disagree with this statement.
 - 58.3% respondents strongly agree with the statement that AI tools help to save time and meet academic deadlines, 23.3% agree with this statement, 12.4% show a neutral response towards this statement, 3.3% disagree with this statement and 2.6% strongly disagree with this statement.
 - 57.1% respondents strongly agree with the statement that AI tools help to reduce stress or academic pressure related to assignments and exams, 22.8% agree with this statement, 13.9% show a neutral response towards this statement, 4.3% disagree with this statement and 1.8% strongly disagree with this statement.
 - 16.2% respondents strongly agree with the statement that use of AI in education raises ethical concern and relying on AI reduces the academic integrity and originality of student work, 11.8% agree with this statement, 18.9% show a neutral response towards this statement, 47.7% disagree with this statement and 5.5% strongly disagree with this statement.
 - 20% respondents strongly agree with the statement that nowadays, students heavily depend on AI tools and destroy their own cognitive skills, problem solving skills, analytical skills, critical thinking and creativity, 10.4% agree with this statement, 13.9% show a neutral response towards this statement, 21.7% disagree with this statement and 33.9% strongly disagree with this statement.
 - 11.3% respondents strongly agree with the statement that nowadays, with the use of AI tools, students' technical skills have enhanced, 59.4% agree with this statement, 20.5% show a neutral response towards this statement, 6% disagree with this statement and 2.8% strongly disagree with this statement.
 - 27.8% respondents strongly agree with the statement that there is a need to establish clear guidelines and policies for responsible use of AI tools in education to avoid academic misconduct, 47% agree with this statement, 14.7% show a neutral response towards this statement, 7.9% disagree with this statement and 2.5% strongly disagree with this statement.
 - 46% respondents strongly agree with the statement that there is a need for educational initiatives to raise awareness among students about the ethical use of AI driven tools, 34.9% agree with this statement, 13.4% show a neutral response towards this statement, 3.5% disagree with this statement and 2.2% strongly disagree with this statement.
 - 52.8% respondents strongly agree with the statement that students should be educated about the responsible integration of AI tools to uphold academic integrity, 28% agree with this statement, 13.2% show a neutral response towards this statement, 4.3% disagree with this statement and 1.7% strongly disagree with this statement.
 - 17.5% respondents strongly agree with the statement that potential for students to submit

content generated by AI tools as their own work raises significant concerns about academic honesty, 14.6% agree with this statement, 15.9% show a neutral response towards this statement, 48.3% disagree with this statement and 3.6% strongly disagree with this statement.

- 21% respondents strongly agree with the statement that integration of AI tools helps the students to explore complex concepts and topics beyond the regular curriculum, 56.5% agree with this statement, 15.7% show a neutral response towards this statement, 4.8% disagree with this statement and 2% strongly disagree with this statement.
- 17.1% respondents strongly agree with the statement that AI tools may undermine the development of students' research and information seeking skills, 12.1% agree with this statement, 16.2% show a neutral response towards this statement, 50% disagree with this statement and 4.6% strongly disagree with this statement.
- 14.4% respondents strongly agree with the statement that AI tools foster a collaborative learning environment where students share and exchange ideas, 57.9% agree with this statement, 18.7% show a neutral response towards this

5. Conclusion:

We tested the hypothesis

H₀: Students feel that AI tools have not significantly improved their learning and the efficiency of academic work

H₁: Students feel that AI tools have significantly improved their learning and the efficiency of academic work

Since the p value or significance value is $0.000 < 0.05$, we reject H₀ and conclude that students feel that AI tools have significantly improved their

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statement, 6.3% disagree with this statement and 2.6% strongly disagree with this statement.

- 12.1% respondents strongly agree with the statement that AI tools reduce the amount of valuable teacher-student interaction in the classroom, 11.9% agree with this statement, 15.4% show a neutral response towards this statement, 34.4% disagree with this statement and 26.2% strongly disagree with this statement.
- 18.4% respondents strongly agree with the statement that AI tools are a valuable means to assist students with language barriers or learning difficulties, 60.8% agree with this statement, 15.9% show a neutral response towards this statement, 3.3% disagree with this statement and 1.7% strongly disagree with this statement.
- 19.7% respondents strongly agree with the statement that AI tools improve students' self-directed learning and research skills, 58.3% agree with this statement, 15.7% show a neutral response towards this statement, 4.6% disagree with this statement and 1.7% strongly disagree with this statement.
- 91.7% respondents recommend the use of AI tools in education to other students while the remaining 8.3% do not recommend the use of AI tools in education to other students.

learning and the efficiency of academic work

We tested the hypothesis

H₀: Students feel that AI tools do not have a significant effect on their problem-solving skills

H₁: Students feel that AI tools have a significant effect on their problem-solving skills

Since the p value or significance value is $5.266 \times 10^{-10} < 0.05$, we reject H₀ and conclude that students feel that AI tools have a significant effect on their problem-solving skills

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