PERCEPTIONS OF SELECTED UNIVERSITY STUDENTS FROM THE NORTHEAST AND WESTERN REGIONS OF INDIA REGARDING THE APPLICATION OF GENERATIVE ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION

April 2025 **Jigyasha Deka**

PERCEPTIONS OF SELECTED UNIVERSITY STUDENTS FROM THE NORTHEAST AND WESTERN REGIONS OF INDIA REGARDING THE APPLICATION OF GENERATIVE ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION

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NOTE

The examiners are requested to keep in mind while evaluating the student's project report of either the dissertation or the action project.

The master students can choose dissertation work or action project for 15 credits. The written reports or a dissertation can be 120 to 130 pages, while the report of an action project can be 60 to 80 pages. The dissertation can have hypotheses and qualitative/ quantitative statistical analysis, while the action project can have field- type evaluation using only percentages.

An action project or research study must be accompanied by appendices, giving an account of physical proof of having conducted an actual project or study, e.g., maps, photographs, drawings, samples, attendance records, booklets, etc.

At the time of viva-voce examination, a student who has carried out an action project may present actual project models, charts, equipment, objects, etc., used in carrying out the projects as further proof of the project.

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CERTIFICATE

This is to certify that the dissertation entitled "**Perceptions of Selected University Students from the Northeast and Western regions of India regarding the Application of Generative AI in Higher Education**" has been carried out by the investigator under my supervision and guidance for the partial fulfilment of the Degree of Master of Science (Faculty of Family and Community Sciences). The matter presented in this dissertation has not been submitted for the award of any otherdegree or diploma.

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ABSTRACT

The study on "***Perceptions of Selected University Students from the Northeast and Western regions of India regarding the Application of Generative AI in Higher Education***" aimed to assess perceptions of selected students' and knowledge regarding applying Generative Artificial Intelligence (GenAI) tools in higher education. This exploratory study comprised a sample of two hundred twenty university students from educational institutes of the North-Eastern region, viz., College of Community Science (CCSc), Assam Agricultural University (AAU), Jorhat, Assam and from the Western region viz., Faculty of Family And Community Sciences (FFCSc), The Maharaja Sayajirao University of Baroda (MSU), Vadodara, Gujarat; using purposive and snowball sampling technique, data was collected in-person for the respondents. The Statistical Package for the Social Sciences (SPSS) was applied for descriptive and inferential statistical analysis.

The study reveals that over half of the respondents (55.5%) are middle-aged between 21 and 25 years old, with the majority (62.7%) from FFCSc, MSU in Gujarat, and the rest (48.2%) from CCSc, AAU in Assam. The majority (73.6%) are female, with a high percentage of female respondents from FFCSc, MSU, Gujarat. Over half (56.4%) are in undergraduate programs, with 68.2% from CCSc, AAU, Assam, and 44.5% from MSU, Gujarat. Nearly half (58.2%) are average achievers, with 60% from FFCSc, MSU, Gujarat, and 56.4% from CCSc, AAU, Assam. Most respondents have more GenAI usage for academic purposes, with 59.1% from CCSc, AAU, Assam, and 56.5% from FFCSc, MSU, Gujarat. The majority (64.1%) are knowledgeable, with 68.2% from CCSc, AAU, Assam, and FFCSc, MSU, Gujarat. The study also shows mixed perceptions regarding the benefits of applying GenAI in higher education, with 49% of respondents identifying more benefits. However, over half (56.4%) express greater concern about GenAI applications in higher education. The findings underscore the need for policymakers to develop ethical guidelines and tailored interventions for the responsible use of GenAI tools across educational levels, in collaboration with educators, administrators, and multi-stakeholders.

keywords: Applications of GenAI tools, perceptions, university students, higher education, Assam, Gujarat

CHAPTER 1
INTRODUCTION

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INTRODUCTION

1.1 Overview of Generative Artificial Intelligence (Generative AI)

Generative Artificial Intelligence (Generative AI) refers to the subset of artificial intelligence that focuses on creating new content such as text, images, music, and videos. Training models accomplish this on large datasets, allowing them to generate outputs that are not direct replicas of the data but new creations based on learned patterns.

Generative AI has become increasingly significant across various sectors, including education, where it is driving transformative changes.

The development of advanced machine learning models such as Generative Adversarial Networks (GANs) and transformer models like GPT-4 has propelled the capabilities of Generative AI to unprecedented levels, making it a cornerstone of modern AI applications (Zawacki-Richter et al., 2019).

1.2 GenAI adoption across various industries

Generative AI adoption has surged across industries, with the technology sector leading the charge at an impressive 88 percent usage rate across functions in 2024. This rapid integration of AI technologies is reshaping business operations, particularly in marketing and sales, where AI has found widespread application as a creative assistance tool. However, this swift adoption has not come without challenges, as concerns about regulatory compliance have grown in tandem with the increased usage.

1.2.1 Varied adoption rates across sectors

While the technology industry stands at the forefront of generative AI adoption, other sectors are not far behind. Professional services, advanced industries, and media and telecom all report adoption rates of around 80 percent across functions. Interestingly, in the tech, media, and telecom industry, IT departments lead in generative AI application usage at 34 percent, followed by product development at 17 percent. This trend differs in the energy, resource, and industrial sector, where operations take the lead at 23 percent, with IT following at 17 percent.

1.2.2 Evolving landscape of AI implementation

As organizations increasingly integrate generative AI, the landscape of implementation is evolving. Automation and argentic AI have emerged as the most intriguing technological developments for organizations in 2024. A notable increase in technical skills related to AI accompanies this shift, indicating broader usage. However, the rise in regulatory concerns suggests that governments and authorities are stepping up their oversight of the industry. This dual trend of increased adoption and heightened regulatory scrutiny underscores the complex environment in which AI technologies are being deployed and developed. Projections indicate the Generative AI market will reach US$66.89bn in 2025.

Analysts project the market to grow at a 36.99% annual rate (CAGR 2025-2031), reaching US$442.07bn by 2031. In global comparison, the largest market size will be the United States (US$21.65bn in 2025).

https://www.statista.com/outlook/tmo/artificial-intelligence/generative-ai/worldwide

1.3 Key statistics of AI & GenAI—Global and Indian Scenario

- The emergence of Artificial Intelligence (AI) is driving significant changes in the higher education sector. AI, which includes technologies like machine learning and natural language processing, enables machines to accomplish jobs that previously required human intelligence. This transformative power is now making its way into institutions, addressing a critical need: promoting student achievement in an ever-changing learning environment. The increased number of pupils, combined with increasingly different learning styles and needs, places pressure on established support structures. Larger class numbers frequently limit customized attention, and widely available tools may not address individual learning gaps. AI provides a convincing solution to these problems. AI may considerably support student achievement initiatives by using student data to forecast areas of difficulty, personalizing learning routes, and providing around-the-clock assistance. This has the potential to increase not only academic performance and graduation rates but also provide a more interesting and engaging learning environment for all students. AI is transforming the field of higher education. The impact of AI on education shows that over 50% of

higher education institutions in the United States use artificial intelligence. AI-powered early alarm systems led to a 10% decrease in its dropout rates. By 2023, approximately 50% of college students were using AI tools. The graduation rate increased by implementing an AI solution, resulting in a 4.8% increase three years later (Your Guide to AI in Higher Education, n.d.)

https://www.quadc.io/everything-you-need-to-know-about-ai-in-higher education

- The Stanford University Artificial Intelligence Index Report 2024 further emphasizes India's leadership in AI skill penetration and talent concentration, showcasing the nation's significant investment in AI education and workforce development. This data underscores the global trend towards AI-driven education and the increasing demand for AI skills across various sectors (Stanford University, 2024).
- Zhang et al. (2022) show that India's AI literacy is globally advanced, as demonstrated by India's world's highest relative AI skill penetration rate. 2022.
- Salesforce research indicates that generative AI presents both opportunities and challenges across various sectors (Salesforce, 2025). While a significant portion of the general population, particularly in India and among younger generations, is actively using generative AI, concerns about data security, accuracy, and the necessity of adequate training persist among workers (Salesforce, 2025). https://www.salesforce.com/news/stories/generative-ai-statistics/
- A report by LinkedIn and Microsoft indicates that 92% of knowledge workers in India are using AI at work, compared to the global average of 75%. This highlights the rapid integration of AI tools in educational and professional settings, driving the need for AI literacy and skills among students and educators alike (Microsoft & LinkedIn, 2024).

1.3.1 Indian Scenario

- India is rapidly emerging as a global leader in AI adoption, particularly in the education sector. The Government of India has recognized the potential of AI to transform education and has implemented various initiatives to integrate AI into the curriculum.

- The National Education Policy 2020 emphasizes the importance of AI literacy and advocates for the development of AI-related courses in higher education to meet the demands of the evolving job market (Ministry of Education, 2020a).
- The Ministry of Education has also highlighted the need for AI-driven personalized learning solutions, which can address the diverse needs of students across the country. Initiatives such as the 'Building AI Readiness among Young Innovators' program aim to democratize access to AI tools and empower students with the skills needed to thrive in an AI-driven world (NITI Aayog, 2018).
- The EY India report titled "How much productivity can GenAI unlock in India? The AIdea of India: 2025," published on January 14, 2025, outlines the transformative potential of Generative AI (GenAI) in reshaping the Indian workforce and economy by 2030. EY survey shows 24% of tasks across industries have the potential for full automation, and 97% of executives cite lack of talent as a primary hurdle. (India, 2024a)

  https://www.ey.com/en_in/newsroom/2025/01/unlocking-productivity-gains-gen-ai-to-transform-38-million-jobs-by-2030-ey-india#:~:text=The%20Aidea%20of_%20India:%202025'.%20By%202030%2C,of%20Gen%20AI%20by%20the%20unorganized%20sector

  Major highlights from this report include:

- Experts expect GenAI to revolutionize 38 million Indian occupations by 2030, considerably increasing economic productivity. The organized sector will receive a 2.61% productivity boost, and an additional 2.82%, according to predictions.
- GenAI can fully automate 24% of tasks across industries and augment another 42%, saving knowledge workers up to 8-10 hours each week. The high labor-to-output ratio in the services sector positions it to profit the most. Businesses like those in financial services, healthcare, and retail will see significant shifts in client acquisition, operations, and service delivery.
- The IT/ITeS and BPO industries will undergo significant changes, whereas the auto and pharma sectors may see minor productivity gains (~2%).

- Business Process Improvements: Call center management could increase productivity by up to 80%, software development by 61%, content production by 45%, customer service by 44%, and sales and marketing by 41%.
- Only 3% of Indian firms have enough in-house AI experience, and 97% of executives see this as a major obstacle to implementation.
- GenAI adoption is still in its early stages, with only 15% of organizations using it at scale and 36% having yet to begin experimenting.
- AI adoption is becoming more affordable for small and medium-sized businesses, creating new opportunities. The research underlines the need for talent development and public-private collaborations to position India as a worldwide leader in AI.

  So, it's not exaggerating to state that generative AI is ubiquitous. Generative AI is making an impact in nearly every industry, including business, healthcare, e-commerce, and entertainment. Similarly, the education sector is using generative AI to tailor learning and improve education quality. As the pandemic struck the world, in the education sector, schools, colleges boldly shifted to internet channels. This move makes employing generative AI in teaching more convenient and simpler. But can generative AI improve and engage students in education? If so, how? (India, 2024b)

  https://www.ey.com/en_in/newsroom/2025/01/unlocking-productivity-gains-gen-ai-to-transform-38-million-jobs-by-2030-ey-india#:~:text=The%20Aidea%20of%20_India:%202025'.%20By%202030%2C,of%20Gen%20AI%20by%20the%20unorganized%20sector

1.4 Generative AI in Education

Artificial Intelligence (AI) refers to how machines and computer systems can emulate human intelligence and decision-making capabilities. Machines can use this AI to make decisions, learn, adapt to changes, etc.

One can also generate new content, art, multimedia, etc., with the help of machines trained to carry out these functions. Such systems are called generative AI.

Using generative AI in education means that one can support learning with the help of these AI-powered systems to deliver content and instructions, ask questions, evaluate performance, etc. (The Role of Generative AI in Education: Use Cases, Benefits, and Challenges in 2024, n.d.)

https://www.fullestop.com/blog/generative-ai-in-education-use-cases-benefits-and-challenges

1.5 Advantages of Using Generative AI in Higher Education

The advantages of Generative AI in higher education for students and teachers are summarised below:

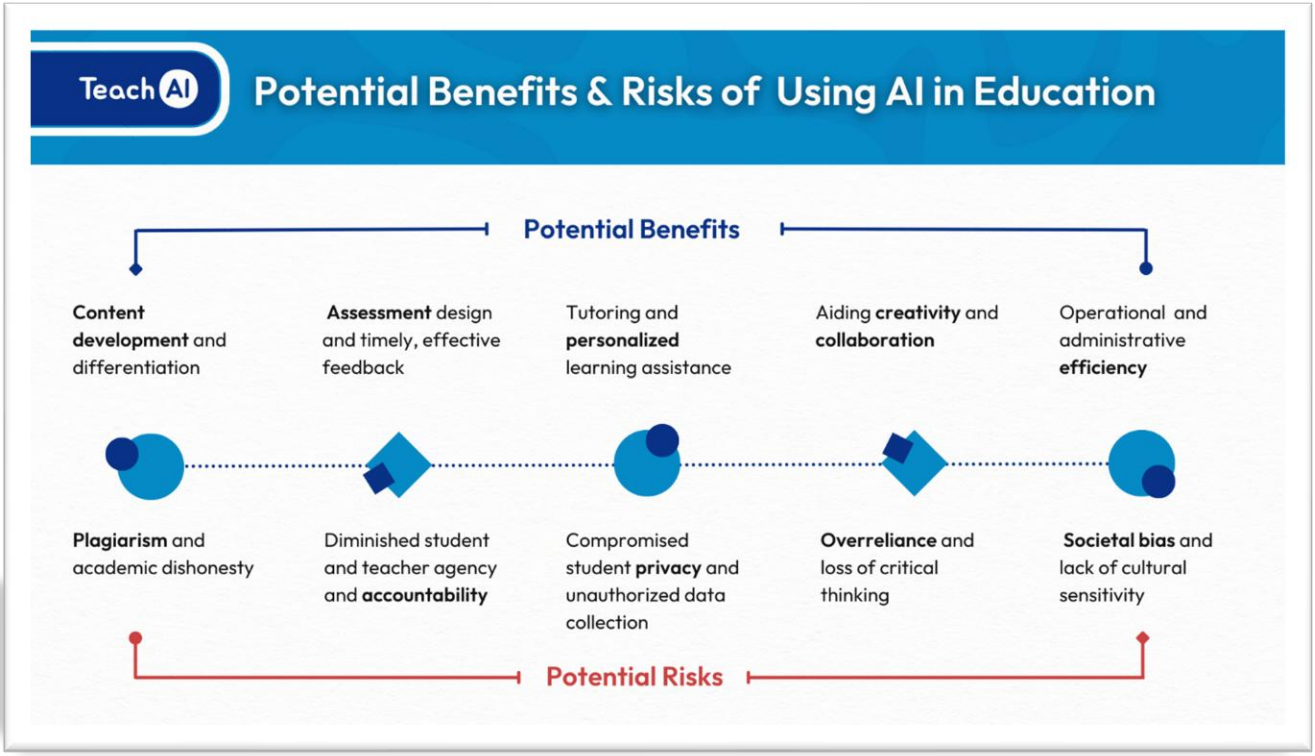
- **Content Development and Differentiation**
  - GenAI can assist learners, educators in creating diverse and customized learning materials. It can generate content for various formats, such as text, images, and videos, catering to different learning styles and preferences.
  - By automating content creation, GenAI allows instructors to focus on higher-order tasks like curriculum design and pedagogical strategies.
- **Assessment Design and Timely Effective Feedback**
  - GenAI can design assessment questions, quizzes, and exams. It ensures that questions are well-structured, cover relevant topics, and maintain appropriate difficulty levels.
  - Automated grading and feedback systems powered by GenAI provide students with prompt evaluations, enabling timely intervention and personalized guidance.
- **Tutoring and Personalized Learning Assistance**
  - GenAI can act as a virtual tutor, answering student queries, explaining concepts, and providing additional resources.
  - Educators can create personalized learning paths based on individual student progress, adapting to their strengths, weaknesses, and learning pace.
- **Aiding Creativity and Collaboration**
  - GenAI can inspire creativity by generating novel ideas, brainstorming solutions, and suggesting innovative approaches.
  - Collaborative tools powered by GenAI facilitate group projects, idea sharing, and interdisciplinary collaboration.

- **Operational and Administrative Efficiency**
    - GenAI streamlines administrative tasks, such as scheduling, resource allocation, and student record management.
    - It enhances institutional efficiency by automating routine processes, allowing educators and administrators to focus on strategic planning and student support.

Generative AI is a double-edged sword, on one hand, it shows potential benefits in higher education on the other it also presents potential risks associated with its use.

1.6 Emerging Concerns / Ethical Issues in Using Generative AI in Higher Education

- **Plagiarism and Academic Dishonesty**
    - Generative AI tools can inadvertently facilitate plagiarism by generating content that closely resembles existing work.
- **Data Privacy**
    - The use of Generative AI involves handling large amounts of data. Ensuring data privacy and compliance with regulations (such as General Data Protection Regulation) is crucial.
- **Diminished Student and Teacher Agency and Accountability**
    - Overreliance on AI-generated content may reduce students' critical thinking and creativity.
- **Compromised Student Privacy and Unauthorized Data Collection**
    - AI systems may inadvertently collect sensitive student information during interactions.
- **Overreliance and Loss of Critical Thinking**
    - Relying solely on AI-generated content may hinder students' ability to think critically and engage deeply with course material.
- **Societal Bias and Lack of Cultural Sensitivity**
    - Generative AI models can inherit biases present in training data, perpetuating stereotypes.



Source: https://www.weforum.org/agenda/2024/01/ai-guidance-school-responsible-use-in-education/

Figure 1: Potential benefits and risks of using AI in education

- The above scenario reflects that, across the world, the initial concern in education was that students would use GenAI tools like ChatGPT to cheat on their assignments, thus undermining the value of learning assessment, certification, and qualifications (Anders, 2023).
- While some educational institutions banned the use of ChatGPT, others cautiously welcomed the arrival of GenAI (Tlili, 2023).
- Many schools and universities, for instance, adopted a progressive approach believing that 'rather than seek to prohibit their use, students and staff need to be supported in using GenAI tools effectively, ethically and transparently' (Russell Group, 2023).
- This approach acknowledges that GenAI is widely available, is likely only to become more sophisticated, and has both specific negative and unique positive potential for education.

  Guidance for generative AI in education and research - UNESCO Digital Library

1.7 Regional AI Initiatives in India: Gujarat's Tech Hub and Assam's Educational Revolution

The Gujarat government has made tremendous efforts to improve its artificial intelligence (AI) capabilities through strategic partnerships with prominent technology corporations. In June 2024, the state inked memoranda of understanding (MoUs) with IBM and Microsoft to build an AI cluster in Gujarat International Finance Tec (GIFT) City. This program intends to promote innovation and collaboration, particularly in the financial technology sector, by exploiting advanced AI technologies like machine learning and cognitive services.

The MoUs also include plans to create AI curricula for institutions, allowing students to interact with cutting-edge technology while preparing for future job markets. Institutions such as Gujarat Technological University (GTU) are already offering courses with generative AI capabilities, boosting the state's educational landscape.

Assam, on the other hand, is making progress in AI education through the Assam AI Initiative, which aims to establish a network for AI-interested students and researchers. This project mentors and organizes events with industry leaders to address regional-specific difficulties with AI solutions. The purpose is to help students improve their knowledge and skills in this fast-growing sector.

In addition, the Government of Assam has established the Shiksha Setu App to promote communication in the educational sector. This app makes it easier to access instructional resources and manage attendance to increase school transparency and efficiency, and this is projected to greatly improve student outcomes. AI is not only changing the educational landscape in Assam, but it is also positioning the state as a potential hub for advanced learning and technological innovation.

Both states are thus actively attempting to incorporate AI into their educational institutions and sectors, but in distinct ways that are customized to their own regional requirements and resources.

(https://www.facebook.com/iamabakshi, 2024)

https://startupstorymedia.com/insights-gujarat-government-partners-with-ibm-and-microsoft-to-boost-ai-capabilities/

Generative AI is fast revolutionizing education by providing tailored learning experiences and improving academic quality. While AI writing helpers and intelligent teaching systems have tremendous potential, they also pose significant obstacles. The future of learning with generative AI involves tailored learning paths, interactive simulations, and real-time feedback to increase engagement. Common applications include producing individualized training materials, automating tests, and offering virtual coaching, as well as customizing information to individual learning styles. As educators investigate using AI-driven tools to acquire insights into student achievement and facilitate data-informed decision-making, this investigation is conceptualized to answer crucial research questions. (ET CIO, 2024)

https://cio.economictimes.indiatimes.com/news/artificial-intelligence/gujarat-govt-signs-partnership-agreement-with-intel-corporation-for-ai-readiness/111613753

1.8 Research Questions

1) What is the level of awareness of the use of Generative AI among university students of Assam and Gujarat states of India?
2) How do students perceive the benefits of using Generative AI in higher education?
3) What and how are the ethical and other concerns and considerations associated with the use of Generative AI in higher education, perceived by the students as major stakeholders of the education system?
4) How can educational institutions effectively integrate Generative AI into their teaching and administrative processes to enhance learning outcomes?

So, to answer the above research questions with a proposed study title "A Study on Perceptions of Selected University Students Regarding Use of Generative AI in Higher Education in India" has been conceptualized by the researcher.

1.9 JUSTIFICATION

1.9.1 Justification of Study

- The demand for AI skills in the job market is increasing, with 75% of employers emphasizing their importance for new hires. India has the highest relative AI skill penetration rate globally, with 91% of leaders believing their companies must adopt AI to remain competitive. Thus, to prepare the upcoming generation for the new age, academic institutes must develop their workforce's readiness by embracing AI in education and considering stakeholder perceptions.

- **Readiness of AI-skilled human resources for the new age :** AI proficiency has emerged as a top priority in India Inc.'s hiring strategy, with 75% of employers emphasizing the importance of AI skills for new hires, surpassing the global average of 66%.

  Interestingly, there is a clear preference for AI skills over experience, with 80% of the leaders in India preferring less experienced candidates with AI skills over seasoned candidates lacking such skills, the study revealed. Demand for AI expertise has seen a remarkable 17% jump over the last year, echoing LinkedIn platform insights and findings of the Work Trend Index.

  (Source:- 92% of knowledge workers in India use AI at work as compared to the global figure of 75%. | Mint (livemint.com)

- **Paradigm shift in educational pedagogy**: Generative AI is revolutionizing information processing and presentation in education, challenging traditional methods of teaching, learning, and assessment. Besides that, institutions utilizing AI-powered early alert systems witnessed reductions in dropout rates by up to 10%.(Your Guide to AI in Higher Education, n.d.-b)

  https://www.quadc.io/everything-you-need-to-know-about-ai-in-higher-education

  In such a situation, this study may contribute significantly to achieving SDG4.

- **Student views can help address ethical and practical challenges** related to AI-generated information, such as data privacy, accuracy, and potential misuse.

- **There is an absence of Government AI regulation policy and guidelines** in higher education, even though NEP2020 is highlighting its use and school boards have also adopted it in the curriculum.

- **Cultural, educational, and technological nuances** - The study also aims to explore regional differences and similarities in GenAI usage among students in home science colleges, revealing unique cultural, educational, and technological factors influencing student perceptions. This aligns with India's increasing focus on AI education and the need for data-driven insights to support AI integration in higher education.

  Thus, in the present context of uncertainty, novelty, and weak safety checks, a more cautious approach to generative AI in education is a commonsense course of action where the proposed study is important.

1.9.2 Justification of Sample of the Study

The proposed study comprised higher education students from selected states of Assam and Gujarat, India. So, the rationale behind the selection of university students from Assam and Gujarat home science colleges as the sample for studying perceptions regarding the use of Generative AI (GenAI) in higher education is as follows:

- **Usage of GenAI in higher education students**: The study focuses on the perceptions of Generative AI (GenAI) use among university students in Assam and Gujarat, India. The selection of these students is due to their high usage of various GenAI tools, such as ChatGPT, for academic purposes. Regardless of whether the concerned university permits it or not, students are utilizing AI technology. Therefore, the challenge that faces educational institutions is this: Should they adopt promising new technology and teach students how to use it effectively, or should they keep trying to restrict it ineffectively? Hence, it is essential to understand how
- **Safeguard cognitive domain** - With Generation Z integrating generative AI into their daily routines as seamlessly as any other device, it becomes crucial to implement regulations that safeguard their creative and critical thinking skills.
- **Alignment with national AI initiatives:** As India is increasingly focusing on AI education, the study can provide data-driven insights that support AI integration in higher education.

1.9.3 Justification of variables of the study

1.9.3.1 Age

Younger students (Gen Z) and older students (Gen Y) are likely to have different perceptions regarding the use of generative AI tools in higher education due to several reasons like growing up with advanced technology from a very young age, Gen Z students are likely to be more comfortable and intuitive with generative AI tools. They may see these tools as a natural extension of their learning environment. While also tech-savvy, Gen Y students might have a more critical perspective, having witnessed the rapid evolution of technology and its impacts. They may be more cautious about the limitations and ethical implications of AI.

1.9.3.2 Gender

Gender can influence students' perceptions of generative AI tools in higher education in several ways. Research indicates that students often have higher perceptions of the efficiency and usefulness of AI tools. They may be more inclined to see these tools as beneficial for enhancing productivity and academic performance and vice versa. Further, male students may tend to have higher engagement levels with AI tools, possibly because of greater familiarity and comfort with technology and vice versa. According to a new study from the Slack Workforce Lab, men ages 18 to 29 are 25% more likely to have experimented with artificial intelligence technology than their female counterparts.(Chandonnet, 2024)

https://www.fastcompany.com/91138639/gen-z-women-are-less-likely-to-use-ai-than-gen-z-men-heres-why

1.9.3.3 Programme of study

Students from undergraduate as well as postgraduate and above may have different perceptions regarding the use of generative AI tools in higher education due to several factors like curriculum requirements and its scope of application, skills, acceptability, application of knowledge related to plagiarism aspects, etc. Undergraduate students might prioritize tools that help with understanding course material, improving writing skills, and managing time effectively, whereas postgraduate and above students are likely to focus on tools that assist with specialized research, data interpretation, and producing publishable work.

1.9.3.4 Academic achievements

Students with low academic achievement may perceive Generative AI more positively as a tool to help them meet minimum requirements and improve their grades and vice versa. Whereas those with high academic achievement may be more likely to adopt a deep learning approach and have concerns about Generative AI undermining learning and vice versa.

1.9.3.5 Knowledge regarding the use of Generative AI

Students' knowledge of generative AI can significantly influence their perceptions toward its use in higher education. Those students with less knowledge of the use of GenAI in higher education might struggle with evaluating AI content critically and could be more susceptible to misinformation or over-reliance on AI tools and vice versa. More knowledgeable students may be more enthusiastic about integrating AI into their studies and are proactive in exploring new tools and applications, and vice versa.

1.9.4 Justification of the study in the Department of Extension and Communication

Undertaking a study of university students' perceptions regarding the use of generative AI in higher education holds significant value for development of professionals and students. The department's higher education programs at the UG, PG, and Ph.D. levels are directly relevant to the broader goals of higher education. Consequently, the insights from this proposed study could significantly contribute to understanding how key stakeholders in the education sector are using generative AI tools in both curricular and extracurricular contexts. It is essential to explore how higher education students perceive these tools—whether they provide benefits or create risks—to inform relevant guidance at the faculty and university levels for effective policy formation. Furthermore, the Government of India's public policy think tank, NITI Aayog (2018), recognizes the importance of AI literacy as a national priority, a sentiment echoed in the National Education Policy 2020, which emphasizes the integration of AI in education (Ministry of Education, 2020a). Given that the Department has already introduced elements of NEP 2020, this study is both highly significant and recommended.

1.10 Objectives of the study

1) To **prepare a profile** of students from the selected universities of Assam and Gujarat states of India.
2) To assess the **GenAI usage pattern from** the selected university students of Assam and Gujarat states of India.
3) To assess the **knowledge level** regarding the application of Generative AI in higher education among the selected university students of Assam and Gujarat states of India.
4) To assess the overall **perceptions** regarding the application of Generative AI in higher education among the selected university students of the Assam and Gujarat states of India.
5) To assess **aspects-wise perceptions** of the selected university students with
   a) benefits
   b) concerns related to the application of Generative AI in higher education.
6) To **assess the perceptions** of the selected university regarding the application of Generative AI in higher education for the **following variables**:
   a) Age
   b) Gender
   c) Programme of study
   d) Academic achievement (of previous semester)
   e) Knowledge related to Generative-AI
7) To study **the overall and aspect-wise differences in** the perceptions of all the students and the institute-wise selected universities' students, regarding the applications of Generative AI in higher education for the above-stated variables.
8) To seek the **suggestions** of the selected students regarding the integration of Generative AI in higher education.

1.11 Null hypotheses of the study

There will be overall and aspect-wise no significant differences in the perceptions of all the students, as well as the selected institute-specific universities' students, regarding the applications of Generative AI in higher education with their variables.

1.12 Assumptions of the Study

1) Selected university students of Assam and Gujarat states possess **knowledge** regarding the application of Generative AI tools in higher education.
2) Knowledge regarding the use of Generative AI in higher education among selected university students will **vary according to the above selected variables**.
3) The perceptions regarding the application of Generative AI tools of selected students **will vary according to selected variables.**

1.13 Delimitations of the study

1) This study will be delimited to the selected students from the selected north-eastern region college viz., College of Community Science at Assam Agricultural University, Assam, and the Western region viz., Faculty of Family and Community Sciences at The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat.
2) The present study will be delimited to study the **knowledge, perceptions, benefits, and concerns** related to the use of Generative AI in higher education.

1.14 Operational definitions of key terms of the study

1) Generative AI (GenAI) in the present study is an artificial intelligence (AI) technology that automatically generates content in response to prompts written in natural-language conversational interfaces. GenAI produces new content by drawing on existing content. The content can appear in formats that comprise all symbolic representations of human thinking: texts written in natural language, images (including photographs, digital paintings, and cartoons), videos, music, and software code.
2) Perceptions–In the present study, it refers to the way that individual students think about the use of GenAI in higher education or the impression one has of it, which is shaped by their prior experiences, interests, and how carefully they process information.

CHAPTER 2
REVIEW OF LITERATURE

CHAPTER 2

REVIEW OF LITERATURE

The current research study, titled "**Perceptions of Selected University Students from the Northeast and Western regions of India regarding the Application of Generative Artificial Intelligence in Higher Education"** consolidates both conceptual and empirical evidence on the application of Generative Artificial Intelligence (GenAI) in higher education.

This chapter of the review of literature draws from four conceptual articles and eighteen empirical studies, providing insights into the applications, roles, usage, benefits, and concerns regarding the application of GenAI in higher education, both within India and internationally.

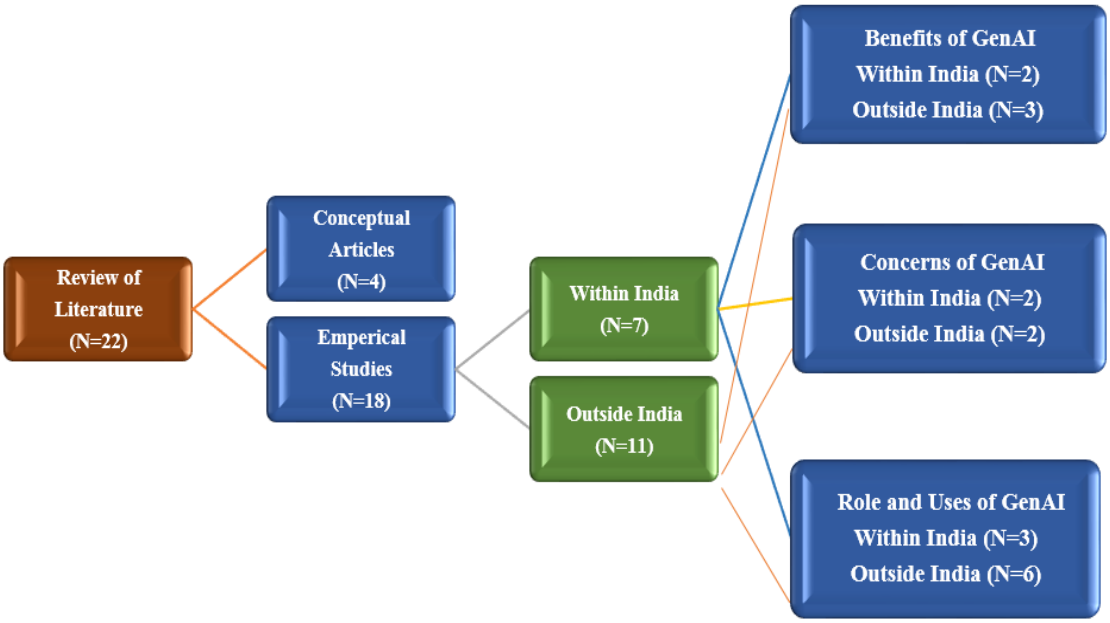


Figure 2: Review of literature for the present study

The process of writing the Review of Literature (ROL) used by the researcher in the present study involves the following steps:

1) Identifying relevant articles,
2) Screening and selecting articles based on specific criteria, and
3) Including the final set of articles in the review.

1) Identification of relevant articles

The search strategy involved databases like Google Scholar, Research Gate, Academia, PubMed, Scopus, and Science Direct to search for articles related to GenAI in higher education. Further books, conference proceedings, and newspapers were also considered as important literature for this study. Articles were selected based on specific inclusion and exclusion criteria.

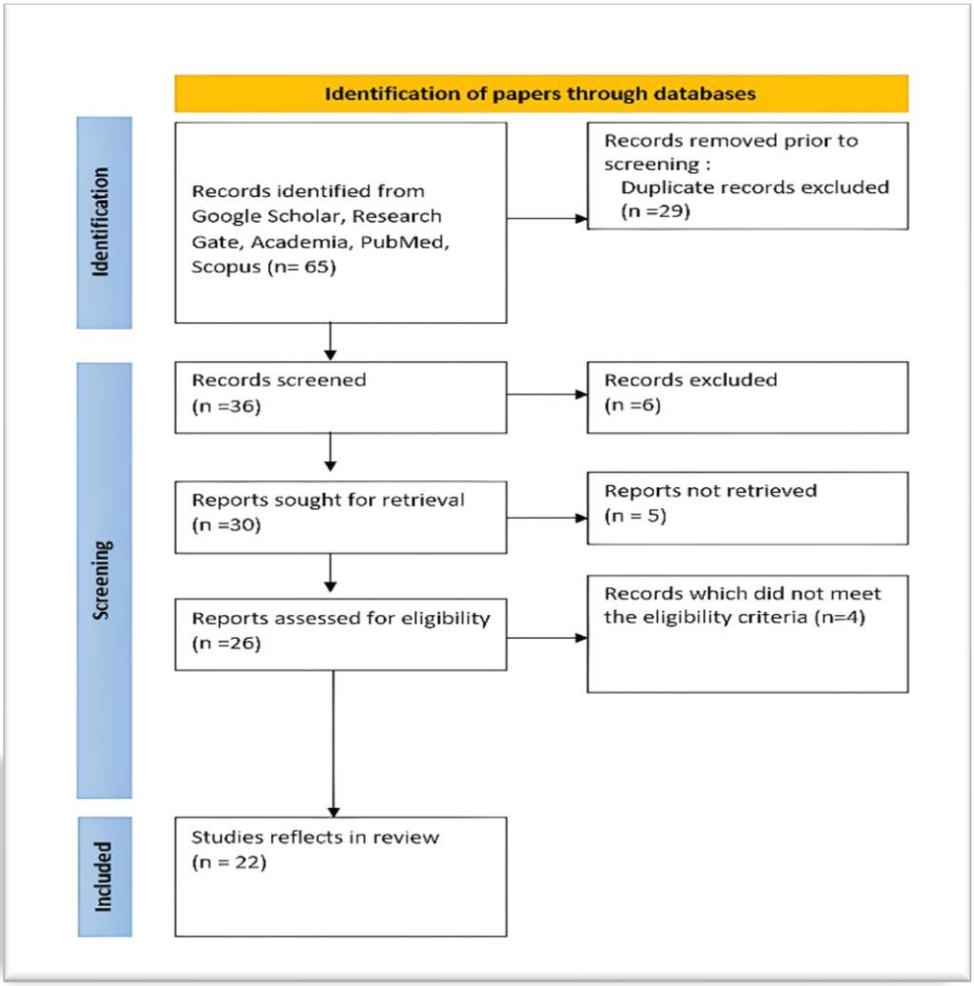


Figure 3: Diagrammatic presentation of identification of papers through databases

Key terms used for the literature search "Generative AI in higher education", "Generative Artificial Intelligence and university students", "Concerns of application of GenAI in universities", "Benefits of application of Generative AI in higher education", "India GenAI usage education policies", "Role and usage of GenAI in higher education"

2) **Screening and selecting articles based on specific criteria**

The inclusion criteria comprised articles published between 2020 and 2024, peer-reviewed journal articles, conference proceedings, and reports on GenAI in higher education focusing on the application, usage, benefits, and concerns of GenAI in higher education, both conceptual and empirical studies, and those conducted within India and outside India.

Exclusion criteria consisted of articles not published in English, studies unrelated to higher education, and articles focusing solely on technical aspects of GenAI without an educational context.

3) **Final Articles included in the review**

Out of the total 65 articles, the researcher selected only 22 relevant and meaningful articles for this chapter.

To enhance understanding, the literature is categorized into two main types: conceptual articles and empirical studies. The empirical studies have been thoroughly examined and organized based on their themes, focusing on:

a) Benefits of Applying Generative AI in Higher Education

b) Concerns Related to the Application of Generative AI in Higher Education

c) Role and Usage of Generative AI in Higher Education

This structure allows for a comprehensive exploration of the topic, incorporating insights from both Indian and international contexts.

2.1 Conceptual articles

- Capano et al. (2025) explore the impact of generative AI on higher education policy in Asia. The article consolidates empirical evidence, practices, assessments, and normative discussions regarding the integration of GenAI into higher education policies.

- Anu & Ansah (2024) examine the potential benefits and drawbacks of using ChatGPT and related generative AI tools in education. In this article, they highlight how these tools can promote personalized and interactive learning, generate prompts for formative assessments, and address privacy and bias issues.

- Logan (2024) discusses the ethical concerns associated with the use of generative large language models (LLMs) like ChatGPT in publishing research. This article raises awareness of concerns associated with environmental impact, exploitive labor practices, bias, plagiarism, authorship, and reference accuracy while using GenAI in higher education.
- Niraj (2023) explores the role of generative AI in higher education, emphasizing its potential to transform teaching and learning. In his article, he discusses several use cases, including personalized learning and customized learning paths based on students' performance data. It also highlights how Generative AI can automate the creation of curriculum materials, save time, reduce costs, and enable educators to focus on personalized instruction.

2.2 Empirical Studies

2.2.1 Benefits of application of GenAI in higher education

2.2.1.1 Within India

- Sahu & Sahu (2024) conducted a study titled "Revolutionary Applications of Generative AI in Higher Education Institutes (HEIs) and its Implications" at an unspecified Indian university. This study used a descriptive research design and survey method with a sample size of 200 students selected through systematic random sampling. The key findings suggest that generative AI significantly enhances educational practices by improving student learning outcomes and reducing repetitive tasks for educators. However, it also highlights the risks of misuse, particularly concerning students' writing and critical thinking abilities.
- Sharma & Singh (2024) carried out a study titled "Adoption of Artificial Intelligence in Higher Education: An Empirical Study of the UTAUT Model in Indian Universities." This quantitative study used a correlational research design with a sample of 150 students, academics, and support staff from various universities selected through multistage sampling. The major findings support significant hypotheses and provide recommendations for stakeholders in developing strategies to maximize AI's potential in the unique context of Indian higher education.

2.2.1.2 Outside India

- Saúde et al. (2024) examined the impacts of GenAI in higher education in a mixed-methods study at two higher education institutions in Portugal, with a sample of 112 students selected through snowball sampling. The findings suggest that GenAI can enhance academic work and learning feedback but requires pedagogical support to foster critical, ethical, and digital literacy skills.
- Abdullah & Zaid (2023) conducted a study titled "Perceptions of Generative Artificial Intelligence in Higher Education Research" at a single institution in Jordan, targeting postgraduate research students in the field of social sciences. Using a qualitative case study approach with a purposive sample of 33 researchers, the findings reveal significant engagement with Generative AI, emphasizing the importance of responsible and ethical AI usage.
- Chan & Hu (2023) explored students' perceptions of generative AI technologies such as ChatGPT in Hong Kong. This cross-sectional study surveyed 399 undergraduate and postgraduate students from various disciplines, selected through quota sampling. The findings indicate a generally positive attitude toward GenAI, recognizing its potential for personalized learning support, writing assistance, and research capabilities. Concerns were raised about accuracy, privacy, and ethical issues.

2.2.2 Concerns of application of GenAI in Higher Education

2.2.2.1 Within India

- Baruah & Baruah (2024) explored the ethics of generative AI in open and distance learning (ODL) in Guwahati, Assam. Their study assessed the importance of generative AI, particularly ChatGPT, in enhancing learning experiences in ODL. The findings highlighted the need for transparency in AI-generated content to prevent misinformation and underscored the necessity of strong regulations to mitigate potential misuse.
- Guleria et al. (2023) examined ChatGPT's ethical concerns and challenges in academics and research in Chandigarh. The study aimed to highlight the use of AI and AI-assisted technologies like ChatGPT in scientific writing, addressing biases, the spread of inaccurate information, and plagiarism. The findings revealed inaccuracies in the content generated by ChatGPT, often with incorrect or fabricated references. This raises significant concerns about the potential for spreading misinformation, particularly in critical fields like medicine.

2.2.2.2 Outside India

- Acosta-Enriquez et al. (2024) examined the knowledge, attitudes, and perceived ethics regarding the use of ChatGPT among Generation Z university students in Peru. The study revealed that, while students had knowledge and generally positive attitudes toward ChatGPT, these did not guarantee its effective adoption and use. Ethical concerns must be addressed with responsible use programs in higher education to ensure academic integrity and privacy.
- Mironova et al. (2024) explored ethical concerns in the use of generative tools in higher education across different countries. The study found significant differences in perceptions of the ethicality of using generative AI tools among students from various countries, with Bulgarian students considering the use of ChatGPT more unethical compared to others. This highlighted the critical need to understand student attitudes towards generative AI technology to enhance engagement and acceptance in educational contexts.

2.2.3 Role and Usage of GenAI in Higher Education

2.2.3.1 Within India

- Panda & Kaur (2024) explored the role of generative AI in academia at Punjabi University, Patiala, Punjab. The study examined various applications of generative AI, such as literature review, visualization, content generation, plagiarism detection, language enhancement, data analysis, and journal selection. The findings emphasized that generative AI significantly reduces researchers' workloads, saves time, and enhances the quality of scholarly outputs.
- Mazumder et al. (2024) evaluated the responsible use of generative AI in research publications in Indian research journals indexed in Scopus. The study found that more than 50% of the journals had guidelines on the use of generative AI, with the highest presence in mathematics. However, the lack of standardized and structured information regarding these guidelines poses challenges for authors.

- Rane (2023) investigated the roles and challenges of generative AI, particularly ChatGPT, in achieving the Sustainable Development Goals (SDGs), with a focus on quality education (SDG 4). The study, conducted in Mumbai, found that ChatGPT significantly contributes to quality education by providing personalized learning experiences and supporting educators, but also highlighted ethical concerns and biases in AI algorithms.

2.2.3.2 Outside India

- In a study conducted by Aldossary et al. (2024), on the perceptions of Saudi students towards the role of generative artificial intelligence (GenAI) tools in education were analyzed. The study, which surveyed 1,390 students from 15 Saudi universities, followed a descriptive quantitative methodology. Key findings revealed that students had positive perceptions of GenAI tools, showing high levels of awareness and acceptance. The GenAI tools were recognized for improving understanding of complex concepts, skill development, self-efficacy, learning outcomes, providing feedback, and making learning meaningful.

- Almassaad et al. (2024) investigated student perceptions of generative AI at King Saud University, Riyadh, Saudi Arabia. The study found that the majority of students frequently use generative AI tools for academic, citing benefits such as ease of access and timesaving. However, challenges such as subscription fees, unreliable information, and impacts on learning autonomy were also noted.

- Nie et al. (2024) explored the role of AI autonomy in higher education through an online Survey of 673 participants. The study focused on three types of AI autonomy (sense, Thought, action) and their impact on students; usage intentions, using the uses and gratification framework. Key findings indicated that sensing autonomy positively influences usage intention through social interaction and entertainment gratifications, thought autonomy is positively related to usage intention via information-seeking and social interaction gratifications, and action autonomy is linked to usage intention through information-seeking and entertainment gratifications.

- Pierrès et al. (2024) conducted a qualitative study using semi-structured interviews with 33 students with disabilities to explore how ChatGPT aids in higher education. The study found that ChatGPT significantly enhances learning outcomes and assists in teaching, writing, reading, research, and self-organization for students with disabilities. The results suggested that higher education institutions should consider the benefits of such tools and provide proper training and information to students.

- Zhou (2024) explored the impact of generative AI on student learning at the University of Washington, USA. The study revealed that students hold a positive attitude toward generative AI and utilize it for various academic tasks. However, ethical concerns and the need for guidelines for its integration were highlighted.

- Chukwuere (2023) conducted a narrative literature review to develop a generative AI Chatbots conceptual framework for higher education. The study synthesized peer-reviewed English-language publications from 2020 to 2023 and focused on user adoption factors such as optimism, innovativeness, discomfort, and insecurity. The findings highlighted the transformative potential of generative AI chatbots in streamlining administrative tasks, enhancing student learning experiences, and supporting research activities. However, the study also emphasized the need for ongoing research and adaptation to address challenges such as academic integrity concerns and resource allocation.

2.3 Trends Analysis of Reviewed Literature

- From the above literature, the reviewed studies were conducted in various regions, with eight studies in India, viz., Assam, Punjab, New Delhi, and Mumbai, and twelve studies were from abroad, viz., Hong Kong, Jordan, Latvia, Washington D.C., Peru, China, and Saudi Arabia.

- Regarding research methods, it was observed that the survey method was predominantly used for collecting quantitative data. Other methods included interviews, descriptive research design, cross-sectional research design, and case studies.

- In the above empirical studies, sample sizes ranged from 11 to 1390, with various sampling techniques such as simple random, systematic random, quota, snowball, and multistage sampling. Data was collected using pre-structured questionnaires and structured interviews.
- Further, the above studies examined benefits, concerns, usages, and the role of GenAI in higher education, wherein variables included the impact of GenAI on student learning, role of libraries, challenges, familiarity with GenAI, readiness to adopt the technology, Perceptions of its ease of use and usefulness, ethical concerns, and presence of guidelines for GenAI usage.
- A significant trend observed was the emphasis on ethical concerns surrounding using GenAI, including plagiarism, academic integrity, and data privacy. Institutions were encouraged to develop robust policies to address these ethical dilemmas.
- Some studies also indicated a trend of increasing student engagement with GenAI tools, with a positive correlation between students' familiarity with these technologies and their willingness to use them in academic settings.

2.4 Research Gaps

- The researcher found limited studies from India compared to the global level and a few studies from north-eastern and western India, specifically Assam and Gujarat of India.
- Gap was also observed by noting a lack of studies addressing the perceptions of generative AI in higher education within the context of north-eastern and western Indian regions, and very few studies were found which were focusing on specific generative AI tools like ChatGPT, Gemini, Grammarly, QuillBot, used by students.
- Regarding research areas, the researcher also observed insufficient research on the specific challenges faced by students while using generative AI tools.
- Also, very few studies addressed the concerns of GenAI in higher education.

To conclude, this review highlights the transformative potential of AI in education, acknowledging both its advantages, concerns, as well inherent challenges. AI-powered adaptive learning and automated assessments offer opportunities for personalized education and efficient workflows. However, ethical considerations, potential biases in algorithms, and infrastructural limitations must be carefully addressed to ensure equitable implementation.

CHAPTER 3
METHODOLOGY

CHAPTER 3

METHODOLOGY

This present study aims to understand the "Perceptions of selected university students from the Northeast and Western Region of India regarding the applications of Generative AI in higher education. "

Below is a methodology section, outlining the procedures utilized to carry out the present study-

STEPS	Permission to carry out research from selected universities (AAU and MSU)
	Pilot Study
	Population of the Study
	Sample of the Study
	Construction of the Research tool
	Description of the Research Tool
	Validation of the research tool
	Reliability of the Research tool
	Pre-testing of the research tool
	Ethical Permission
	Data collection
	Scoring and Categorization
	Plan for Statistical Analysis

Procedures utilized to carry out the Present study

3.1 Permission to carry out research in selected Universities (AAU, MSU)

Permission to carry out research for College of Community Science, Assam Agricultural University, Jorhat, Assam and Faculty Of Family And Community Sciences of The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat which are government educational institutions, and any research involving these universities typically requires prior approval from the appropriate authorities. Therefore, the researcher personally contacted the Deans of the respective educational institutions, viz. College of Community Science, Assam Agricultural University at Jorhat, Assam, and Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda at Vadodara, Gujarat. Permission was sought from Dean's for higher education Institutions viz; FFCSc, MSU and CCSc, AAU.

3.2 Pilot Study

To understand the usage of Artificial Intelligence Tools, it is essential to investigate whether students in higher education use them. Given the inherent connection between awareness and usage of AI Tools among students in higher education, the researcher conducted a study to assess the awareness and usage of AI tools by students in higher education in Assam.

The sample size of the pilot study comprised sixty students from different academic streams of selected colleges, viz., Guwahati University, Nalbari College Birjhora, Mahavidyalaya, Pandit Deendayal Upadhyaya Adarsha Mahavidyalaya, which belongs to Nalbari, Kamrup, and Bongaigaon districts of Assam. To select the sample, was convenience sampling technique was used, followed by the snowball method. A structured questionnaire tool was prepared, which comprised demographic information, awareness of Artificial Intelligence and its usage patterns, and challenges in AI integration for educational purposes. Descriptive statistics of frequency and percentage were used to analyze the data.

3.2.1 Major Findings of Pilot Study

3.2.1.1 Demographic Profile of Respondents

The study results highlighted a diverse demographic profile among students. Approximately 40% of the respondents were 20 years of age, with a gender distribution favoring females (63%). Most students (47%) were in their first year of undergraduate studies, predominantly pursuing social sciences (75%). Institutions were primarily public universities (93%), with Nalbari College housing the majority (69%). Despite widespread smartphone ownership (53.3%), internet connectivity was largely limited (92%), posing a significant barrier to digital integration in education.

3.2.1.2 Awareness and Usage of AI Tools

A vast majority (98%) of students had awareness of AI tools, and 75% actively used them. Chatbots like ChatGPT and Grammarly dominated daily usage (40%), while educational applications accounted for 53.3% of AI usage. These findings mirrored global trends; for example, EDUCAUSE (2023) observed increasing AI adoption in education to enhance efficiency and engagement.

3.2.1.3 Use of AI Tools in Higher Education

Most students (82%) reported using AI tools for academics, as 78% dedicated less than three hours weekly to such activities. ChatGPT was the most widely used tool (42%), with applications primarily focused on assignments (42%), idea generation (10%), and information searches (12%). Familiarity with available tools was moderate (58%), with a lack of comprehensive understanding hindering full utilization.

3.2.1.4 Challenges in AI Integration

Students reported various challenges, including poor/ limited internet access (22%), lack of institutional/technical support (23%), privacy concerns (21%), lack of training (2%), lack of knowledge of AI tools (25%) and lack of maintenance cost (7%). These issues aligned with findings from UNESCO's report (2021) on AI in education, which emphasized the need for interventions to address infrastructure and ethical gaps.

3.2.1.5 Interest and Career Opportunities

Interest in AI remained high among students, with 40% expressing a strong interest in learning more. However, only 60% were aware of career opportunities related to AI, highlighting a need for improved guidance and curriculum integration.

3.2.2 Conclusion of Pilot Study

The findings underscored AI's potential to enhance education by facilitating assignments, fostering personalized learning, and improving research outcomes. However, infrastructural challenges, moderate awareness, and privacy concerns impeded full adoption. Targeted interventions could bridge these gaps, enabling students to leverage AI more effectively.

3.3 Population of the study

The population of this study comprised students studying undergraduate (UG), postgraduate (PG), and Ph.D. program in both the higher educational institutes viz; College of Community Science, AAU, Assam and Faculty of Family and Community Sciences, MSU, Vadodara Gujarat from all the five different specializations under Grant-in-Aid program.

It is to note here that though both selected institutes have applied home science discipline in nature, the nomenclature of the five specializations was observed differently among both of them, i.e. in the College of Community Science, Assam five specializations are named Extension and Communication Management., Family Resource Management, Food Science and Nutrition, Human Development, and Family Studies, Textiles and Apparel Designing whereas in Faculty of Family and Community Sciences, Gujarat has specializations in Clothing and textiles, Extension and Communication, Family and community resources Management, Foods and Nutrition, Human Development and Family Studies.

3.4 Sample of the study

The study sample consisted of the selected higher education students currently studying in UG, PG, and Ph.D. programs in each of the departments (for the year 2024-2025) from the above-stated institutes, viz., CCSc, AAU of Assam, and FFCSc, MSU of Gujarat state.

3.4.1 Selection of the sample

This exploratory study uses the probability sampling method, i.e., using a purposive and snowball sampling technique to select the respondents. The researcher identified and approached respondents of university students through in-person interactions at the institute level.

3.4.2 Criteria for selection of the sample

➢ **Inclusion criteria**

- Those students who were studying at UG, PG, and Ph.D. level programs in the selected government institutes of Assam and Gujarat during 2024-25, run by the higher education departments of respective states.
- Those students who give consent for the study.
- Those students who were using the GenAI application in their academics.

➢ **Exclusion criteria**

- Those who do not give consent.
- Those students who were not studying at UG, PG, and Ph.D. level programs in the selected government institutes of Assam and Gujarat during 2024-25, run by the higher education departments of respective states.

- Those students who are not studying at selected universities in Assam and Gujarat.
- Those who do not use the GenAI application in their academics.

3.4.3 Sampling Unit

The sampling unit in the study refers to the geographic area from which the sample is drawn. For the current study in Assam and Gujarat from two universities total 220 number of students were chosen as the sample.

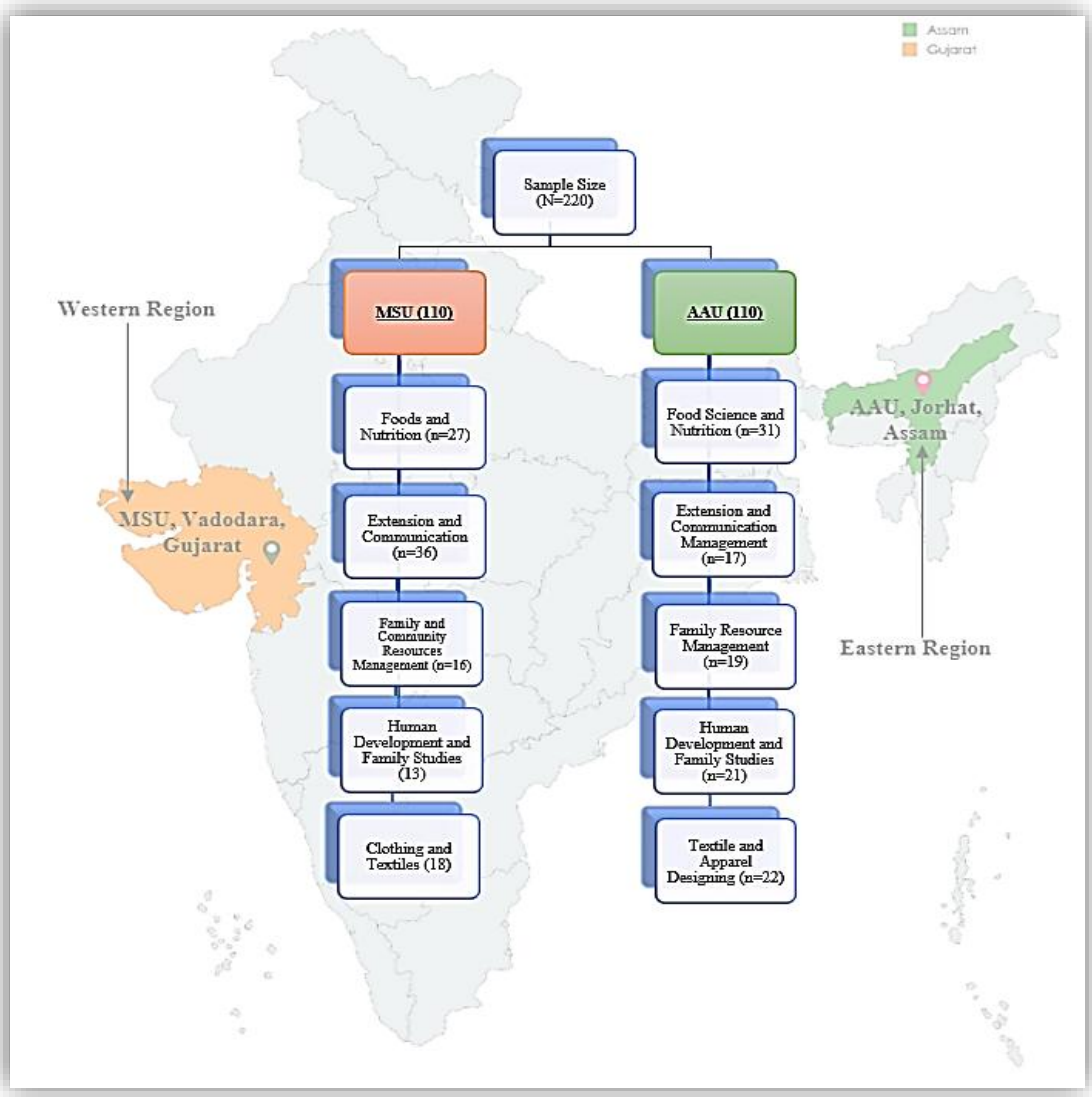


Figure 5 : Sample of the study

A sampling frame was obtained from the administrative office of the College of Community Science, AAU, Jorhat, and Faculty of Family and Community Sciences, MSU, Baroda to approach respondents from each department of the stated university at Assam and Gujarat.

3.4.4 Sample Size

In total, 220 students (from all the programs viz., undergraduate, Post Graduate Degree, and Diploma, as well as Doctorate, were approached at both universities for each specialization.

3.5 Construction of the research tool

Research tools are crucial for any study and have a significant impact on the quality of data collected. The researcher created a structured English questionnaire based on pilot study results and referring relevant literature, which comprised questions about demographics, information related to the usage of GenAI in Higher Education, Knowledge related to the application of GenAI in Higher Education, perceptions on Benefits related to the Application of GenAI in Higher Education, perceptions on Concern related to the Application of GenAI in Higher Education, Suggestions to integrate the Application of GenAI in Higher Education.

3.6 Description of the tool

The researcher designed a questionnaire with five (5) sections to delve into the Perceptions of selected university students from the Northeast and Western regions of India regarding the applications of GenAI in higher education. Each section of the questionnaire is described below.

Table 1: Research Tool Section and Response System

Sections	Parameters	Total No. of items	Tools	Response System
Section A Part 1	Demographic profile of the respondents	9	Multiple-choice and open-ended questions	Selecting an appropriate option from a provided list and wherever it is instructed, fill in the blank with the appropriate response.
Section A Part 2	Usages of GenAI	7	Multiple-choice questions and open-ended questions	Selecting an appropriate option from a provided list and wherever it is instructed, fill in the blank with the appropriate response
Section B	Knowledge related to Application of GenAI Tools	15	Multiple-choice questions	Selecting an appropriate option from a given list that best applies to the respondent. One Correct Answer
Section C	Benefits related to the application of GenAI Tools	30	Interval scale	5 Point rating scale
Section D	Concern related to the application of GenAI tools	20	Interval scale	5 Point rating scale
Section E	Suggestion to integrate the application of GenAI tools	13	Interval scale	3 Point rating scale

Details of research tools prepared and used for data collection from selected university students from the northeast and western regions of India are as follows:

Section A: Demographic and Other than Demographic details

Part 1: Demographic Information of the Respondents

This section consisted of information on the respondents' names, age, gender, names of the universities, names of the departments, names of the program, year of study, and academic achievements of the respondents. These were the independent variables for the present study.

Part 2: Information related to the usage of GenAI

This section aimed to familiarity with GenAI and its usage in academic work. This section comprised seven (7) multiple-choice questions and open-ended questions, in which the respondents were asked about their familiarity with different GenAI tools in academic activities, the purpose of using the GenAI tools, duration of since when they were using different GenAI applications in academics, sources of information for learning about new GenAI applications and whether they have undergone any training program related to GenAI tools or not?

Section B: Knowledge related to the application of GenAI

Knowledge of GenAI improves decision-making, analysis of data easily, and many more. This part of the questionnaire included a knowledge test on the application of GenAI. This section consisted of fifteen (15) MCQs (Multiple-Choice Questions) related to the application of GenAI.

Section C: Students' perceptions of benefits of the application of GenAI

Students' perceptions of the benefits of the application of GenAI tools has a significant impact on their knowledge, usefulness in their higher education. This section consisted of fifteen (15) statements to their perceptions regarding the benefits of the application of GenAI tools among the selected university students of Assam and Gujarat. The statements in the section included both positive and negative perspectives about the benefits to the application of GenAI tools in higher education. The measurement of perceptions was done using a five-point rating scale that consisted of fifteen statements.

Section D: Students' perceptions of Concerns about the Application of GenAI

Students' perceptions of concern about the application of GenAI has a significant impact on their ethical considerations and education guidelines in their higher education. This section consisted of twenty (20) statements to their perceptions regarding concern of the application of GenAI tools among the selected university students of Assam and Gujarat. The statements in the section included both positive and negative perspectives about concern for the application of GenAI in higher education. The measurement of perceptions was done using a five- point rating scale that consisted of twenty statements.

Section E: Suggestions to integrate the application of GenAI

This section presented twelve statements proposing a way to promote GenAI tools in higher education, to increase usage with ethical consideration, proper guidelines, awareness, and policy making.

3.7 Validity of the research tool

The research tool was validated by eight experts, including five teaching faculties from the Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, and three teaching faculties from Assam Agricultural University. Necessary modifications in the research tool were done as per the expert's feedback, which enhanced the tool's effectiveness in terms of relevance, logical order, language use, and response system.

3.8 Reliability of research tool

The Cronbach's Alpha coefficient test was used to determine the researcher's tool's reliability and ensure internal consistency. The internal reliability test yielded a result of $\alpha = 0.98$, indicating high internal consistency. The test-retest method was used to assess external reliability. The questionnaire demonstrated high internal consistency, with a result of $\alpha = 0.92$, indicating high consistency of the tool.

3.9 Pre-testing for the research tool

The questionnaire was pre-tested with twenty students from AAU and MSU in Assam and Gujarat to ensure clarity. The goal was to assess language clarity and determine the time required to complete the form. The tool was made simple and understandable by removing ambiguous items that were found. On average, 13-15 minutes were needed to complete the questionnaire.

3.10 Ethical Approval of the Study by the IECHR Committee

To ensure the protection of research respondents and maintain the integrity of the research process, on October 23rd, 2024, the researcher submitted the study to the IECHR Committee for ethical approval. The ethical committee approved it with an ethical approval number by IECHR/FFCSc/M. Sc./10/2024/15.

3.11 Data Collection

Between 6th November 2024 and 30th December 2024, the research tool, a questionnaire, was distributed to the selected 220 university students via in-person meetings. Out of 230 distributed questionnaires, 10 incomplete/ invalid questionnaires were excluded and considered 220 valid tools for formal data analysis. All the 220 samples were collected through offline mode.

3.11.1 Difficulties faced while collecting the data

1. Respondents required constant, repeated reminders.
2. Respondents had trouble understanding the questionnaire, so the researcher had to explain it to them.

3.11.2 Tabulation of Data

Data were coded under the conclusions on the response scores, and the researcher created an excel spreadsheet for the same purpose.

3.12 Scoring and Categorizing of the Data

3.12.1 Scoring and Categorizing of Variables

The components contained under the different parts of the tools were given varying Weight-age using various scoring procedures.

Table 2: Categorization of Variables of the Study

Sl. No.	Variables	Basis	Categories
1.	Age	<=20	Young
		21-25	Middle
		26-30 and above	Old
2.	Gender	Male	Male
		Female	Female
		Other	Other
3	Program of the Study	Undergraduate	1st Year
			2nd Year
			3rd Year
			4th Year
		Post-Graduate Diploma/Degree	1st Year
			2nd Year
		Doctorate	1st Year
			2nd Year
			3rd Year
4.	Academic Achievement	50%-65%	Low achievers
		66%-81%	Moderate achievers
		82%-97%	High achievers
5.	Knowledge related to GenAI	Below Mean	Less knowledgeable
		Mean and above mean	knowledgeable

3.12.2 Scoring and categorization of usages of GenAI tools

A three-point rating scale was developed to measure the usages of GenAI level of selected university students of Assam and Gujarat. The scoring pattern for statements was as follows:

Table 3: Scoring of usages of GenAI tools

No. of items	Minimum score	Maximum score
7	1	84

Thus, the current usage scores for GenAI tools ranged from 1 to 84. Individual scores were computed for each of the respondents and then were then classified according to their scores as follows:

3.12.3 Categorization of usages of GenAI tools

Table 4: Categorization of Scores in Usage of GenAI tools

	Range	Basis	Categories
Usages of GenAI tools	18-34	Below mean	Low usage
	35-48	Mean and above mean	High usage

Respondents scoring between 18-35, i.e., below the mean, were categorized as respondents with less usage, while those scoring between 35-48 or mean and above the mean were categorized as respondents with more usage of GenAI tools.

3.12.4 Scoring and Categorization of students' knowledge for the application of GenAI tools

The respondents' application of GenAI knowledge was assessed using a knowledge test. The test scoring process was as follows: one point was given for each correct response and zero points for each erroneous response:

Table 5: **The possible scores of the knowledge test**

Type of Statements	Minimum score	Maximum score
Multiple-choice questions	0	15
Total	**0**	**15**

The maximum and minimum scores for the knowledge test were 15 and 0, respectively. The final score for each student was calculated. Researchers then categorized the respondents based on their scores.

Table 6: Categorization of scores in student's knowledge of the application of GenAI tools

Variable	Range	Basis	Categories
Knowledge related to GenAI	3-11	Mean and below mean	Less Knowledgeable
	12-15	Above mean	knowledgeable

Those who had scores above the mean were regarded as knowledgeable, whereas those who received scores between 3 and 11, or in the mean or below the mean, were regarded as less knowledgeable.

3.12.5 Scoring and Categorization of students' overall perceptions regarding the application of GenAI tools

Table 7: Categorization of scores in student's overall perceptions regarding the application of GenAI tools

	Range	Basis	Categories
Overall perceptions	125-148	Mean and below mean	Less Favorable
	149-202	Above mean	Favorable

Respondents with scores between 125-148, or mean and below the mean, were regarded as having less favorable Perceptions, while those with scores between 149-202, or above the mean, were considered having favorable Perceptions.

3.12.6 Scoring and Categorization of students' overall perceptions related to benefits regarding the application of GenAI tools

Table 8: Categorization of scores in students' overall perceptions of benefits regarding the application of GenAI tools

	Range	Basis	Categories
Overall perceptions related to benefits	76-90	Mean and below mean	Less Favorable
	91-128	Above mean	Favorable

Respondents with scores between 76-90, or mean and below the mean, were regarded to have less favorable perceptions, while those with scores between 91-128 or above the mean were considered having favorable perceptions.

3.12.7 Scoring and Categorization of students' overall perceptions related to concerns Regarding the application of GenAI tools

Table 9: Categorization of scores in students' overall perceptions related to concerns Regarding the application of GenAI tools

	Range	Basis	Categories
Overall perceptions related to concerns	43-57	Mean and below mean	Less Favorable
	58-79	Above mean	Favorable

Respondents with scores between 43-57, or mean and below the mean, were regarded as having less favorable perceptions, while those with scores between 58-79, or above the mean, were considered to have a more favorable perceptions.

3.12.8 Scoring and Categorization of Students' Perceptions of benefits to the application of GenAI tools

Researcher evaluated selected university students' perceptions of the benefits of applying GenAI using a Likert scale. Researchers constructed it using a 5-point scale. The following table shows the scores for both positive and negative statements:

Table 10: Scoring pattern according to the nature of the statement regarding students' Perceptions of benefits related to the application of GenAI tools

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Positive Statements	1	2	3	4	5
Negative Statements	5	4	3	2	1

Table 11: Scoring of data for students' Perceptions on benefits related to application of GenAI tools

Total no. of items	Minimum score	Maximum score
30	15	75

There were 30 statements in total. The range between the lowest and highest possible scores is 30-150.

3.12.9 Scoring and Categorization of students' Perceptions of concerns about the application of GenAI tools

Researchers used a Likert scale to assess university students' views on GenAI applications. Researchers constructed it using a 5-point scale. The following table shows the scores for both positive and negative statements:

Table 12: Scoring pattern according to the nature of the statement regarding students' Perceptions of concerns related to the application of GenAI tools

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Positive statements	1	2	3	4	5
Negative statements	5	4	3	2	1

Table 13: Scoring of data for students' Perceptions of concerns related to the application of GenAI tools

Total no. of items	Minimum score	Maximum score
20	20	100

There were 20 statements in total. The range between the lowest and highest possible scores is 20-100.

3.12.10 Categorization of item-wise Intensity Indices of application of GenAI tools

Researchers calculated intensity indices to the analyze the respondents' engagement with GenAI applications in higher education. The study used a three-point rating scale. The range for the item-wise intensity indices was as follows:

Table 14: Categorization of intensity indices in students' suggestions regarding the application of GenAI tools

S. No.	Categories	Range of Intensity Indices
1.	Less Extent	2.19-2.37
2.	Some Extent	2.38-2.56
3.	Great Extent	2.57-2.75

3.13 Plan for Statistical Analysis of the Data

Microsoft Office Excel was used to clean, tabulate, and enter the data. The researchers used SPSS for the statistical analysis. The statistical measurement that was examined is as follows:

Table 15: Plan for Statistical Analysis of the Data

Sr. No.	Purpose	Statistical measurements
1)	Demographic profile of the respondents	Percentage
2)	Usages of GenAI by respondents in higher education	Percentage
3)	Knowledge related to the application of GenAI in higher education	Percentage
4)	Overall perceptions of respondents regarding the applications of GenAI tools in higher education	Percentage
5)	Variable-wise overall perceptions of respondents for the application of GenAI tools in higher education	Percentage
6)	Differences in the overall perceptions of the respondents regarding the variables	Mann-Whitney U Kruskal Wallis H
7)	Perceptions of respondents regarding benefits of the application of GenAI tools in higher education	Percentage
8)	Differences in the Perceptions of respondents according to the benefits of the application of GenAI tools with variables	Mann-Whitney U Kruskal Wallis H
9)	Perceptions of respondents regarding concerns of the application of GenAI tools in higher education	Percentage
10)	Differences in the Perceptions of respondents according to concerns about the application of GenAI tools with variables	Mann-Whitney U Kruskal Wallis H
11)	Suggestions to integrate of the selected students regarding the applications of GenAI tools in higher education	Percentage and Intensity Indices

Statistical Measures and formula used for the analysis of the data

- **The formula used for Mann-Whitney U Test-**

$$U_1 = R_1 - \frac{n_1(n_1+1)}{2}$$

or

$$U_2 = R_2 - \frac{n_2(n_2+1)}{2}$$

Where, *R* is the sum of ranks in the sample and *n* is the number of items in the sample.

- **The formula used for Kruskal Wallis H Test-**

$$H = \left[\frac{12}{n_T(n_T+1)} \sum_{i=1}^{k} \frac{R_i^2}{n_i} \right] - 3(n_T+1)$$

where:

k = the number of populations

n_i = the number of observations in sample i

$n_T = \sum_{i=1}^{k} n_i$ = the total number of observations in all samples

R_i = the sum of the ranks for sample i

CHAPTER 4
FINDINGS AND DISCUSSION

CHAPTER 4
FINDINGS AND DISCUSSION

4.1 Background Information of the Respondents

4.1.1 Demographic Profile of the Respondents.

Variables-wise frequency and percentage distribution of the selected students of College of Community Science (CCSc), Assam Agricultural University (AAU), Jorhat, Assam, and Faculty of Family and Community Sciences (FFCSc), The Maharaja Sayajirao University of Baroda (MSU), Vadodara, Gujarat.

Table 16: Variable-wise Frequency and Percentage Distribution of the Selected students of CCSc, AAU, Assam and FFCSc, MSU, Gujarat.

(n=220)

S. no.	Variables	Categories	AAU		MSU		Total	
			F	%	F	%	F	%
1	Age	Young	44	40	31	28.2	75	34.1
		Middle	53	**48.2**	69	**62.7**	122	**55.5**
		Old	13	11.8	10	9.1	23	10.5
		Total	**110**	**100**	**110**	**100**	**220**	**100**
2	Gender	Male	42	37.3	16	14.5	58	26.4
		Female	68	**61.8**	94	**85.5**	162	**73.6**
		Total	**110**	**99.1**	**110**	**100**	**220**	**100**
3	Program of study	Undergraduate	75	**68.2**	49	**44.5**	124	**56.4**
		Postgraduate	25	22.7	49	**44.5**	74	33.7
		Doctorate	10	9.1	12	11	22	10
		Total	**110**	**100**	**110**	**100**	**220**	**100**
4	Academic Achievement	Low Achievers	9	8.2	12	10.9	21	9.5
		Moderate Achievers	62	**56.3**	66	**60**	128	**58.2**
		High Achievers	39	35.5	32	29.1	71	32.3
		Total	**110**	**100**	**110**	**100**	**220**	**100**

Variable-wise Frequency and Percentage Distribution of the Selected students of CCSc, AAU, Assam and FFCSc, MSU, Gujarat.

The age-wise frequency and percentage distribution of all respondents for both universities—CCSc, AAU, Assam, and FFCSc, MSU, Gujarat—are shown in Table 16 and Figure 6&7.

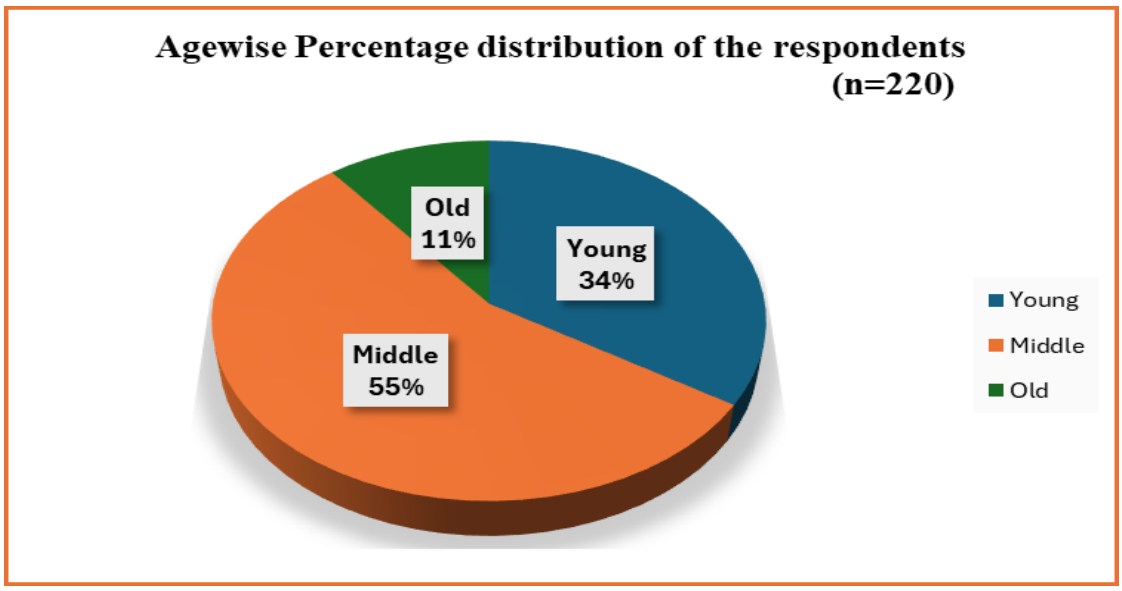


Figure 6: Percentage distribution of the respondents according to their age

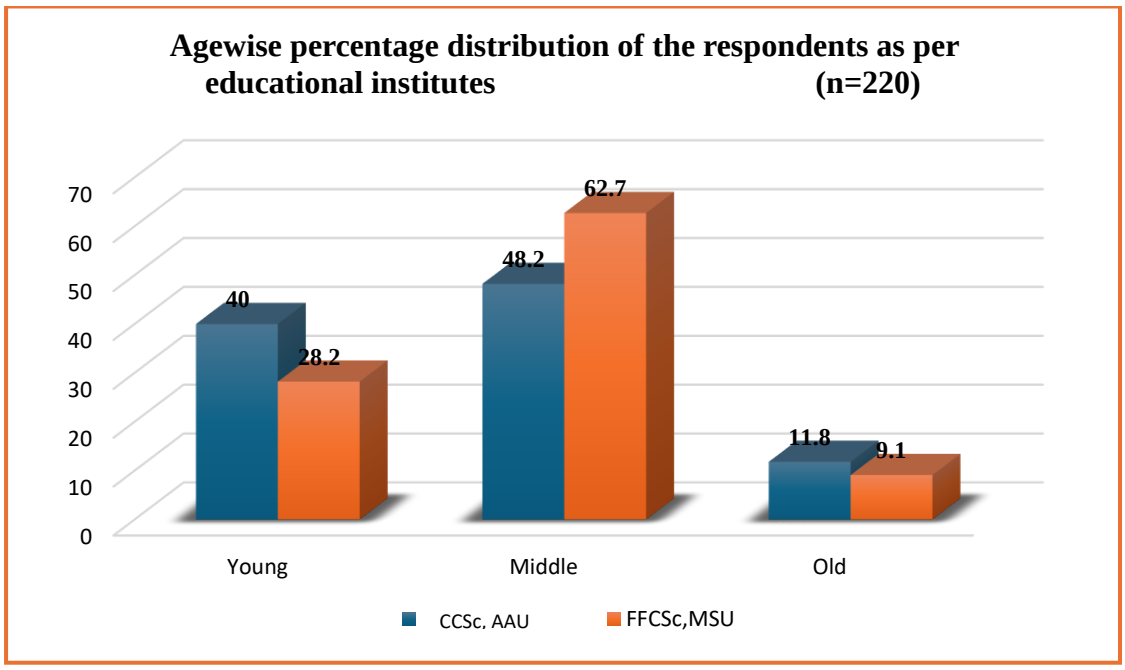


Figure 7: Institute-wise percentage distribution of the respondents according to their age

The results show that slightly over half of the respondents (55.5%) were in the middle age range (21–25 years), with the majority (62.7%) coming from FFCSc, MSU in Gujarat and slightly less than half (48.2%) from CCSc, AAU in Assam.

The older age group (10%) of the remaining respondents from both institutes, who were between the ages of 26 and 30, followed the younger age group (34%) of those under 20 years.

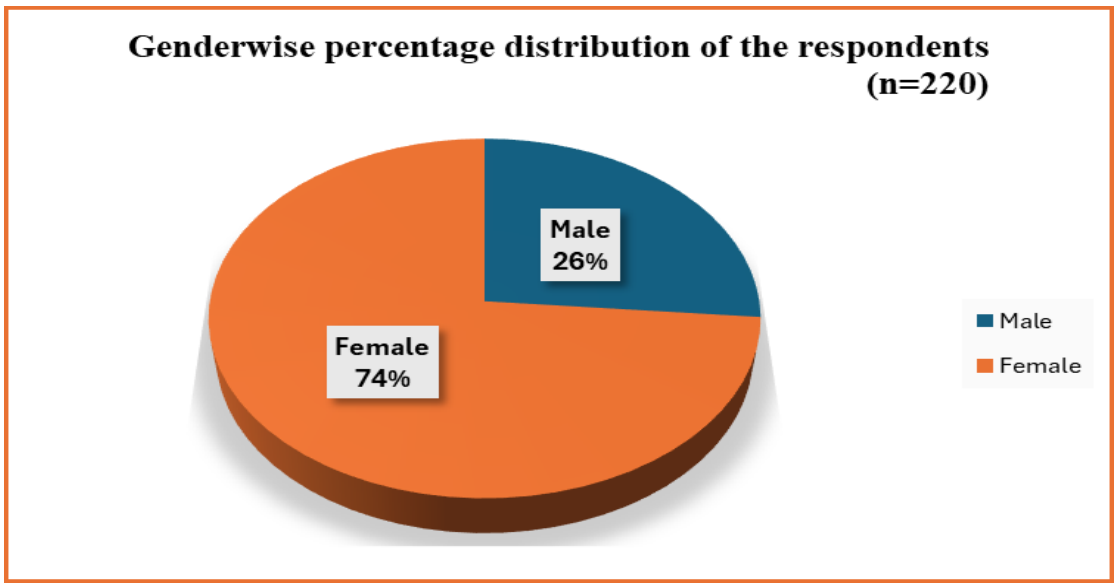


Figure 8: Percentage distribution of the respondents according to their gender

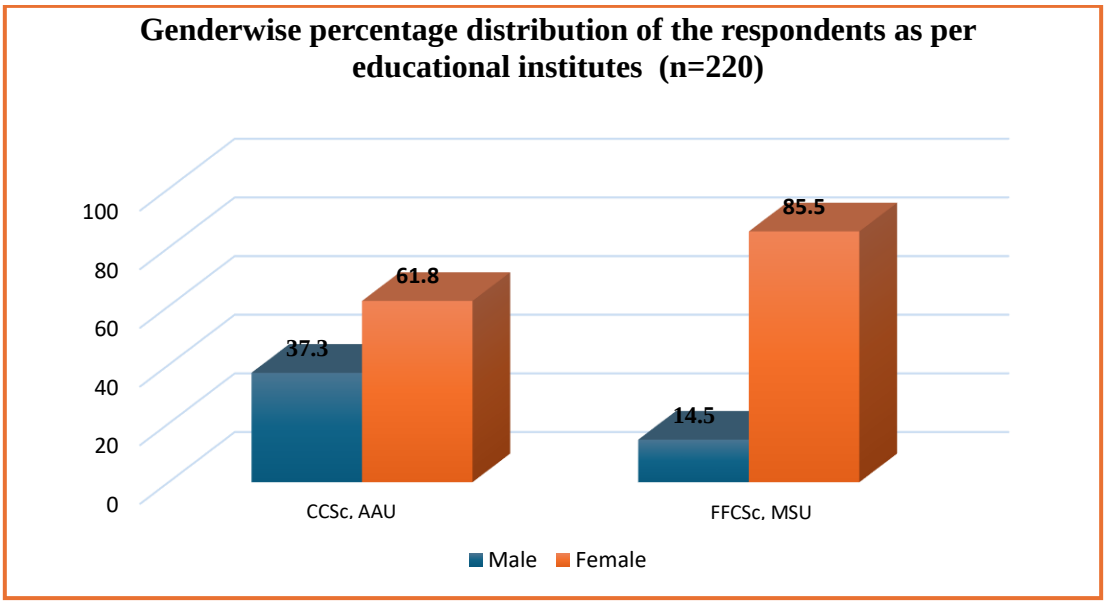


Figure 9: Institute-wise percentage distribution of the respondents according to their gender

Table 16 and Figure 8 & 9 show the gender-wise frequency and percentage-wise distribution of all respondents from both universities—CCSc, AAU, Assam, and FFCSc, MSU, Gujarat. It shows that most of (73.6%) the respondents in the present study were female, followed by male respondents (24.4%).

According to institute-specific results, the highest number (85.5%) of female respondents came from FFCSc, MSU, Gujarat, followed by CCSc, AAU, Assam (61.8%) students.

Here, there were more males (37.3%) at CCSc, AAU Assam than at FFCSc, MSU, Gujarat (14.5%).

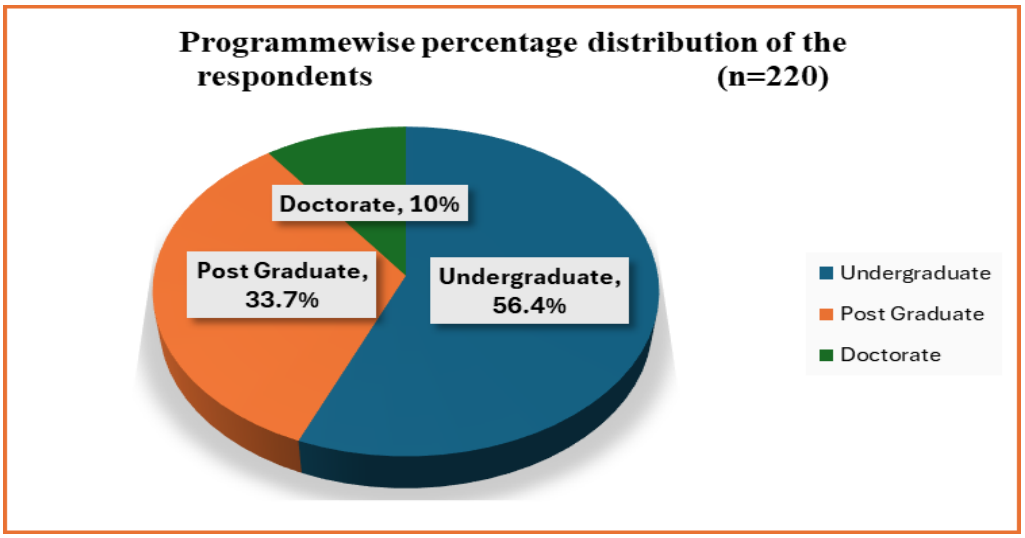


Figure 10: Percentage distribution of the respondents according to their program of study

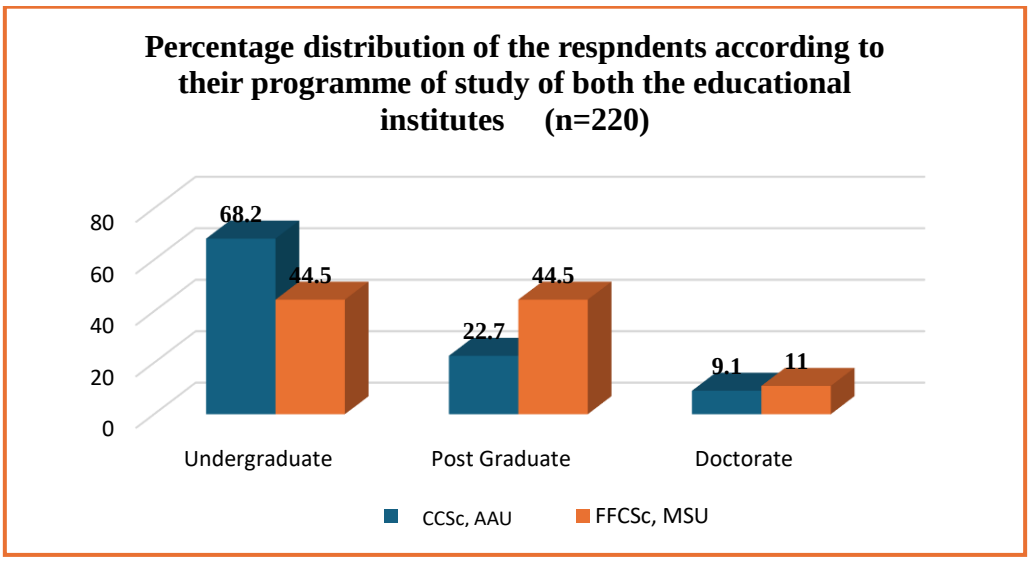


Figure 11: Institute-wise percentage distribution of the respondents according to their program of study

Table 16 and Figure 10&11 present the program-wise overall frequency and percentage distribution of respondents from CCSc, AAU, Assam, and FFCSc, MSU, Gujarat. Overall, the data shows that just over half (56.4%) of the respondents were in undergraduate programs, with the majority (68.2%) coming from AAU, Assam, and less than half (44.5%) coming from MSU, Gujarat. Postgraduate programs accounted for 33.7% of the remaining students, while doctoral programs accounted for 10.0%.

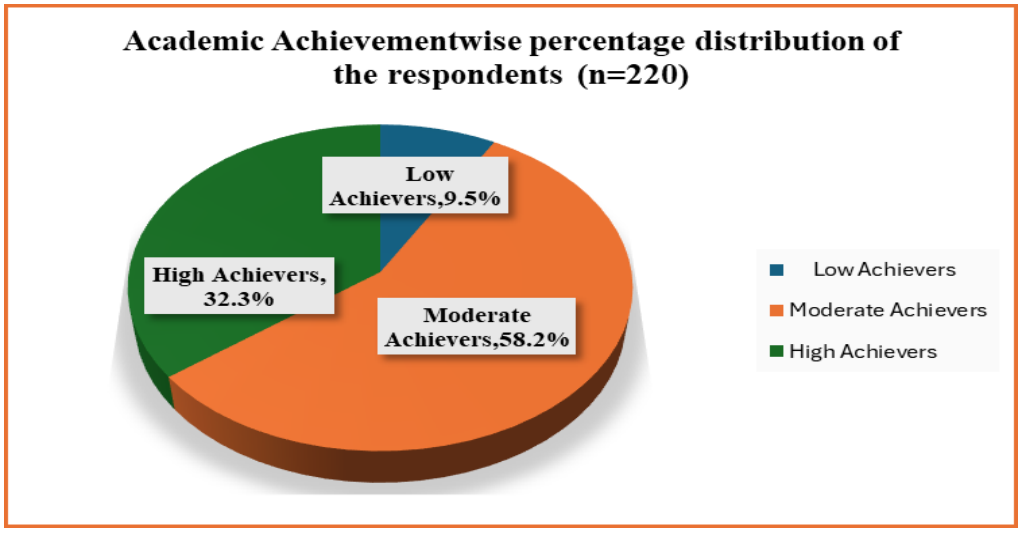


Figure 12: Percentage distribution of the respondents according to their academic achievement

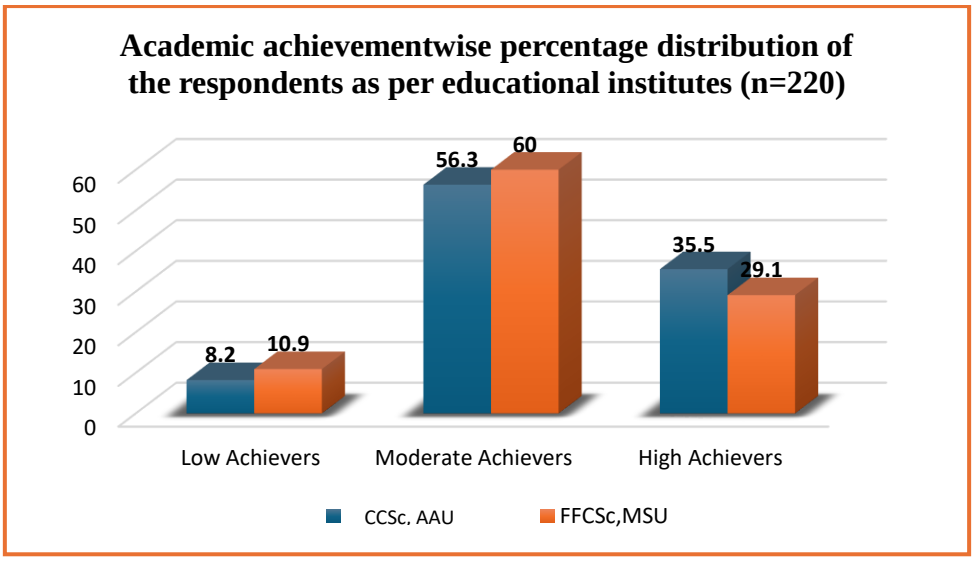


Figure 13: Institute-wise percentage distribution of the respondents according to their academic achievement

Table 16 and Figure 12&13 show the overall percentage distribution of respondents by academic achievement for the universities, namely FFCSc, MSU, Gujarat, and CCSc, AAU, Assam. According to the data, near to majority (58.2%) of the respondents fell into the group of average achievers, among which, with the majority (60%) coming from FFCSC, MSU, Gujarat, and over half (56.4%) of the respondents coming from CCSc, AAU, Assam. The remaining respondents (32.3%) belonged to the high achievers category, while 9.5% were in the low achievers group.

Section A: Other than Demographic details of the respondents

4.1.2 Other than Demographic Details of the Respondents

Frequency and Percentage Distribution of the Selected Students of CCSc, AAU, Assam, and FFCSc, MSU, Gujarat, according to their Usages of GenAI

Table 17: Frequency and Percentage Distribution of Usages of GenAI of Selected Students of CCSc, AAU, Assam and FFCSc, MSU, Gujarat

(n=220)

S. No.	Item		AAU		MSU		Total	
			F	%	F	%	F	%
1	Usage Pattern of GenAI	More usage	69	**62.7**	61	**55.5**	130	**59.1**
		Less usage	41	37.3	49	44.5	90	40.9
		Total	**110**	**100**	**110**	**100**	**220**	**100**

The frequency and percentage distribution of all respondents for both universities—CCSc, AAU, Assam, and FFCSc, MSU, Gujarat, according to their usages of GenAI, are shown in Table 17 and Figure 14&15.

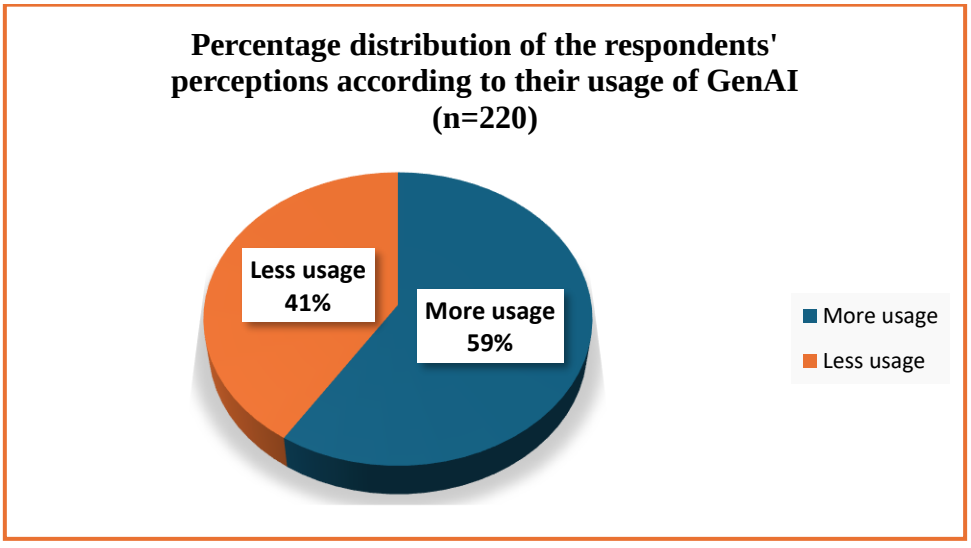


Figure 14: Percentage distribution of the respondents according to their usage of GenAI

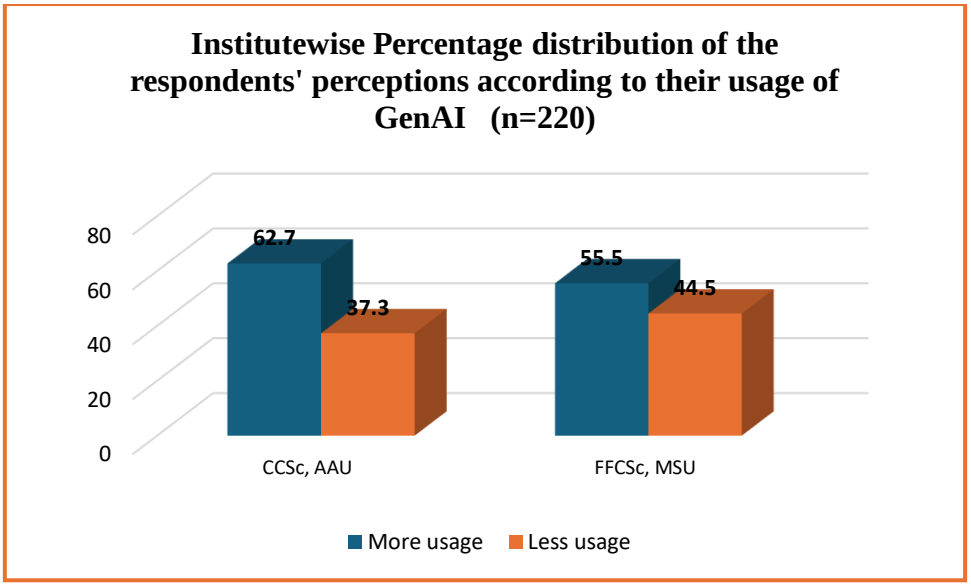


Figure 15: Institute-wise percentage distribution of the respondents according to their usage of GenAI

Table 17 and Figures 14 and 15 show the frequency and percentage distribution of respondents in overall and university-specific Gen Al usage patterns. According to the aggregate data, the majority (59.1%) of the respondents had more GenAI usage, of these, with the majority (62.7%) coming from CCSc, AAU, Assam, and more than half (55.5%) from FFCSc, MSU, Gujarat. The remaining respondents (40.9%) were less users of GenAI.

4.1.3 Usages of Generative Artificial Intelligence by Respondents

Table 18: Frequency and Percentage Distribution According to the Different Elements of Usages of GenAI by the Respondents

(n=220)

Sr No.	Usages of GenAI Tools		AAU		MSU		Total	
			F	%	F	%	F	%
1	**Familiarity with GenAI Tools**	Yes	105	95.5	108	98.2	213	96.8
		No	5	4.5	2	1.8	7	3.2
2	**Uses of GenAI tools in Academic work**	Yes	102	92.7	106	96.4	208	94.5
		No	8	7.3	4	3.6	12	5.5
3	**GenAI Tools that students use in daily academic activities**	Chat GPT	94	85.5	69	75	163	80.7
		Meta AI	82	79.6	72	70.6	43	53.1
		Grammarly	43	51.3	47	73.4	41	69.5
		Canva	47	73.4	51	83.6	98	78.4
		Gemini	25	41.7	25	40	25	39.7
4	**Purpose of using GenAI**	Doing Homework/ assignments	76	69.1	85	77.3	161	73.2
		Generating idea	78	70.9	80	72.7	158	71.8
		Searching for new information	77	70.6	64	58.2	141	64.4
		Content creation	62	56.4	66	60	128	58.2
		Explanation of information	74	67.9	48	43.6	122	55.7
5	**Duration of started using GenAI**	<=3 months	8	7.3	6	5.5	14	6.4
		>3 months	8	7.3	4	3.6	12	5.5
		<= one year	21	19.1	33	30	54	24.5
		> one year	73	66.4	67	60.9	140	63.6
6	**Sources of Information for Learning new GenAI**	By own self	85	77.3	87	79.1	172	78.2
		Friends and peers	73	66.4	69	62.7	142	64.5
		Online tutorial videos	73	66.4	63	57.3	136	61.8
		Social Media	79	71.8	52	47.3	131	59.5
7	**Training on GenAI**	Yes	1	0.9	10	9.1	11	5
		No	109	99.1	100	90.9	209	95

Table 18 reveals the following represent the overall and institute-specific findings of the use of GenAI applications in higher education.

- Overall, almost all (96.8%) of the respondents were aware of the use of GenAI in higher education; of these, almost all (98.2%) of the students were from MSU in Gujarat, followed by most of the (95.5%) AAU, Assam students. The remaining students were unfamiliar with GenAI tools.
- Regarding the use of GenAI tools in academic work, overall data reveal that the vast majority (94.5%) of the respondents used GenAI tools in their academic work; of these, most of the respondents (96.4%,92.7%) were from MSU, Gujarat, and AAU, Assam.
- Findings about the GenAI tools used by students in their daily academic activities showed that a large majority (80.7%) of respondents use ChatGPT primarily in their daily academic activities. Of those surveyed, interestingly, a greater number (85.5%) were AAU respondents than MSU respondents (75%) who use GenAI in their daily academic work.
- The results showed that most respondents (73.2% and 71.8%, respectively) use GenAI for homework/assignments and idea generation. The usage pattern is similar for identical purposes among FFCSc, MSU students, with a large majority (77.3% and 72.7%), followed by AAU students (69.1% and 70.9%).
- Overall, most respondents (78.2%) said they had learned the GenAI application of tools by themselves. Interestingly, a similar pattern appeared among a greater number of FFCSc, MSU students (79.1%), followed by a high majority (77.3%) of AAU students.
- Nearly all the respondents (95.0%) had never received any training on utilizing GenAI applications for academic purposes. Of these, almost all (99.1%) of the students represented CCSc, AAU, Assam, and the vast majority (90.9%) of the students from FFCSc, MSU, Gujarat also used GenAI without any kind of formal training.

Section B: Knowledge related to the application of GenAI Tools

4.2 Knowledge Related to Generative Artificial Intelligence of the Respondents Frequency and Percentage Distribution of the Selected Students of CCSc, AAU, Assam, and FFCSc, MSU, Gujarat regarding their Knowledge related to GenAI

Table 19: Frequency and Percentage Distribution of Knowledge related to GenAI by the Respondents

(n=220)

Sl. No.	Variables	Categories	AAU		MSU		Total	
			F	%	F	%	F	%
1.	Knowledge related to GenAI	Less Knowledgeable	35	31.8	44	40	79	35.9
		Knowledgeable	75	**68.2**	66	**60**	141	**64.1**
		Total	**110**	**100**	**110**	**100**	**220**	**100**

Frequency and percentage distribution of all respondents for both universities—CCSc, AAU, Assam, and FFCSc, MSU, Gujarat, regarding their knowledge related to GenAI are shown in Table 19 and Figure 16&17

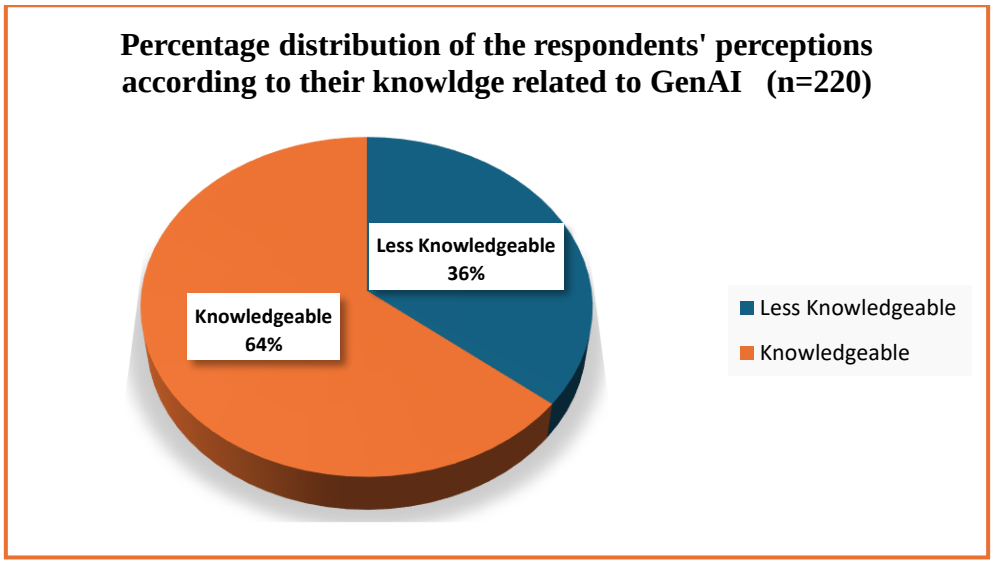


Figure 16: Percentage distribution of the respondents according to their knowledge related to GenAI

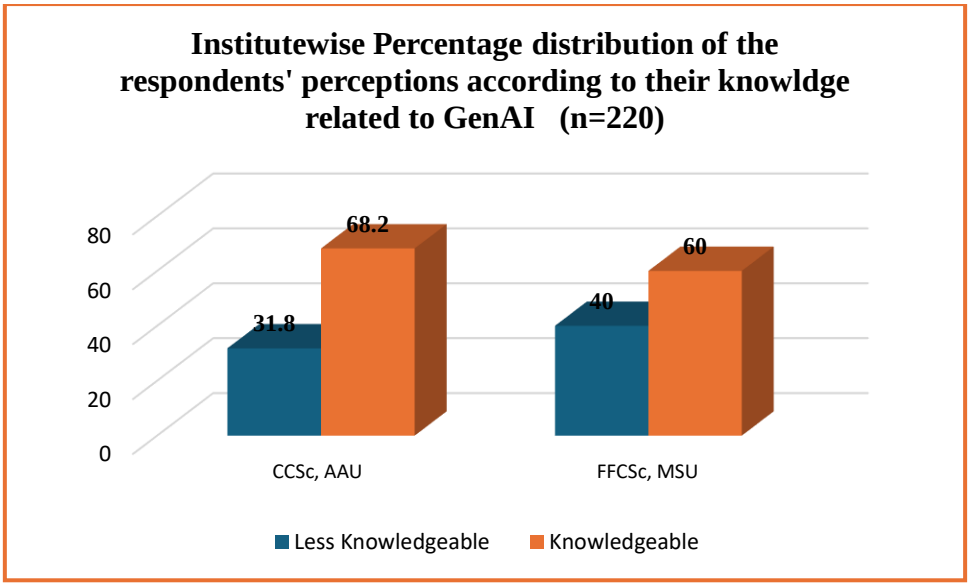


Figure 17: Institute-wise percentage distribution of the respondents according to their knowledge related to GenAI

The frequency and percentage distribution of respondents' knowledge related to GenAI, both overall and by university CCSc, AAU, Assam and FFCSc, MSU, Gujarat are shown in Table_ and Figure_. The majority (64.1%) of respondents fell into the knowledgeable category, according to the overall statistics, among which, with the majority (68.2%, 60%), coming from CCSc, AAU, Assam, and from FFCSc, MSU, Gujarat, respectively. The remaining respondents (35.9%) were having a less understanding of the use of GenAI in higher education.

4.3 Overall Perceptions of the Respondents Regarding Application of GenAI Tools

4.3.1 Overall Perceptions of the Respondents Regarding Application of GenAI Tools Frequency and Percentage Distribution of the Selected Students of CCSc, AAU, Assam and FFCSc, MSU,Gujarat According to their Overall Perceptions regarding the Applications of GenAI tools

Table 20: Frequency and Percentage Distribution of the Respondents Overall Perceptions regarding the Application of GenAI tools

(n=220)

Sl. No.	Students Overall Perceptions regarding the application of GenAI	AAU		MSU		Total	
		F	%	F	%	F	%
1	Less Favourable	49	44.5	51	46.4	100	45.5
2	Favourable	61	55.5	59	53.6	120	54.5
	Total	**110**	**100**	**110**	**100**	**220**	**100**

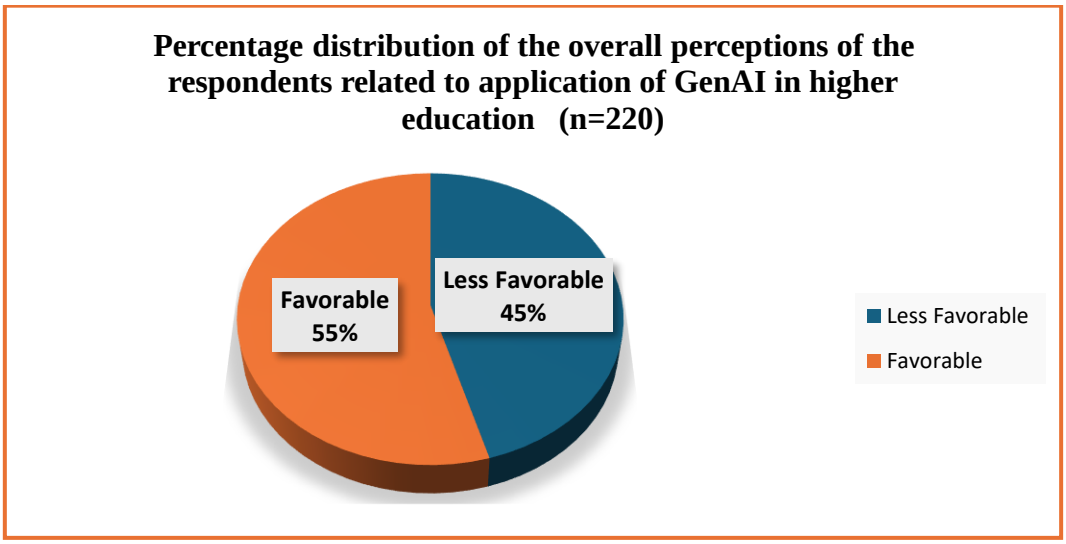


Figure 18 : Percentage distribution of the respondents according to their overall perceptions regarding the application of GenAI tools

Table 20 and Figures 18 & 19 show the frequency and percentage distribution of all respondents from CCSc, AAU, Assam, and FFCSc, MSU, Gujarat regarding their overall perceptions of GenAI tool applications.

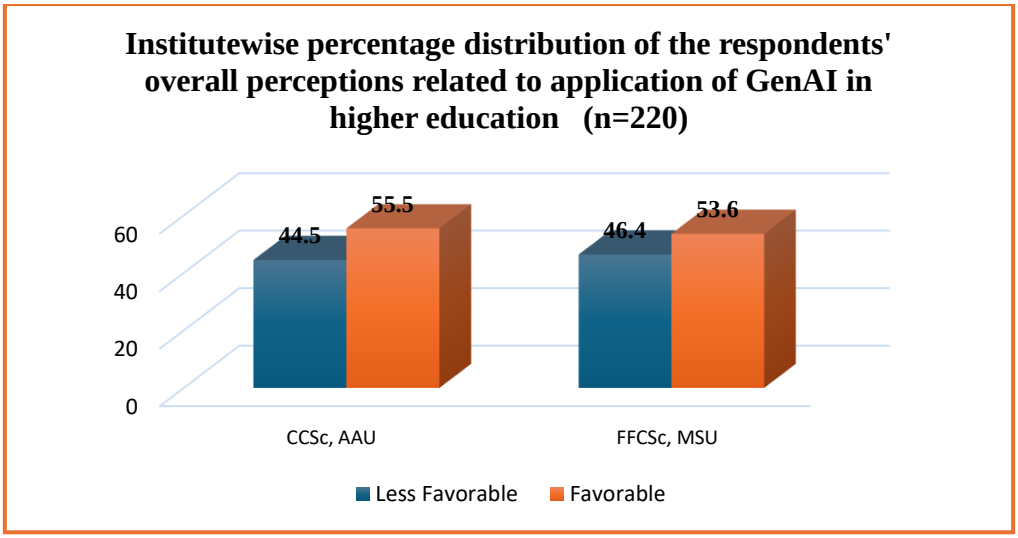


Figure 19: Institute-wise percentage distribution of the respondents according to their overall perceptions regarding the application of GenAI tools

Table 20 and Figure 18&19 reveal the percentage distribution of respondents and their perceptions on the application of GenAI overall and university-wise, viz., CCSc, AAU, Assam; FFCSc, MSU, Gujarat.

The above findings show that, overall, over half of the respondents (54.5%) had a favourable perceptions regarding applications of GenAI in higher education; of these slightly more respondents (55.5%) wer form CCSc, AAU, Assam, than from FFCSc, MSU, Gujarat (53.6%).

The remaining students were having less favorable perceptions regarding the application of GenAI in higher education. The findings, overall and for each university, show that over half of the respondents believe students are already widely using GenAI technologies and applications at universities, thereby revolutionizing higher education.

The study's background data also supports the growing trend of usage of GenAI tools, indicating a trend of integration of GenAI into academic purposes, with a significant portion of respondents knowing these technologies' uses for education. The fact of this finding that over 50% of students see these new technologies favorably suggests that many students may be aware of the advantages of GenAI and how it may help them in their academic endeavors.

The background section's findings on the respondents' usage patterns further corroborate and interpret these favorable perceptions, which are predicated on the notion that GenAI may improve educational opportunities, expedite the learning process, and assist with tasks like completing assignments or homework or generating new ideas. Thus, the utility of GenAI tools in academic tasks for higher education may have led them to favourably perceive it as they may recognize the practical benefits of GenAI tools.

According to the research conducted by Almassaad et al., (2024), 69% of students use generative AI to clarify concepts, while 41% rely on it for assistance with assignments. This highlights the growing integration of such tools in higher education as students explore their potential benefits and applications.

On the other hand, less than half (45.5%) of the respondents also had less favorable perceptions of the application of GenAI tools in higher education. The current study's findings in the category of other than background information and knowledge related to the application of GenAI demonstrated that nearly all respondents, i.e., 96.8%, are familiar with GenAI tools, but not that many respondents used GenAI tools, i.e., 59.1%.

This could be because, though some students possess knowledge related to GenAI, on application understanding may be missing.

Almassaad et al. (2024) in their research highlights that students possess limited knowledge of generative AI (GenAI) tools. Respondents indicated that their limited engagement with GenAI tools stems from a lack of awareness, concerns about potential harms, and disinterest in these technologies.

A study titled "AI Across Borders: Exploring perceptions and Interactions in Higher Education" (2023) examined the perceptions of 1,211 students across institutions in India and found that prior experience with generative AI (GenAI) significantly shaped their views. Students with prior exposure to AI technologies were more likely to perceive them positively, suggesting that familiarity fosters acceptance (AI Across Borders: Exploring perceptions and Interactions in Higher Education, 2023). This study indicates that a significant portion of the student population remains unaware of the applications and

benefits of GenAI within educational contexts. Furthermore, the findings stress that Generation Z students need better digital literacy and proficiency; their hesitation towards new technologies may result from insufficient familiarity and confidence using GenAI tools.

4.3.2 Variables-wise Overall Perceptions of the Respondents Regarding the Application of GenAI Tools

Table 21: **Frequency and Percentage Distribution of Selected Students regarding Overall and Institute-wise perceptions regarding the Application of GenAI tools with reference to their Variables**

(n=220)

		Less Favourable						**Favourable**					
		AAU		**MSU**		**Total**		**AAU**		**MSU**		**Total**	
		f	**%**	**f**	**%**	**f**	**%**	**F**	**%**	**f**	**%**	**F**	%
Age	Young	18	37	13	25	31	31	26	43	18	31	44	37
	Middle	24	**49**	33	**65**	57	**57**	29	**48**	36	**61**	65	**54**
	Old	7	14	5	10	12	12	6	10	5	8	11	9
	Total	*49*	*100*	*51*	*100*	*100*	*100*	*61*	*100*	*59*	*100*	*120*	*100*
Gender	Male	22	45	8	16	30	30	20	33	8	14	28	23
	Female	27	**55**	43	**84**	70	**70**	41	**67**	51	**86**	92	**77**
	Total	*49*	*100*	*51*	*100*	*100*	*100*	*61*	*100*	*59*	*100*	*120*	*100*
Academic achievement	Low achievers	1	2	5	9.8	6	6	8	13.1	7	11.9	15	12.5
	Moderate achievers	27	**55**	33	**64.7**	60	**60**	35	**35**	33	**55.9**	68	**56.7**
	High achievers	21	43	13	25.5	34	34	18	18	19	32.2	37	30.8
	Total	*49*	*100*	*51*	*100*	*100*	*100*	*61*	*61*	*59*	*100*	*120*	*100*
Knowledge related to GenAI	Less Knowledgeable	15	31	16	31	31	31	20	33	28	47	48	40
	Knowledgeable	34	**69**	35	**69**	69	**69**	41	**67**	31	**53**	72	**60**
	Total	*49*	*100*	*51*	*37*	*100*	*100*	*61*	*100*	*59*	*100*	*120*	*100*
Program of study	Undergraduate	29	**59**	19	37	48	**48**	46	**75**	30	**51**	76	**63**
	Postgraduate	14	29	25	**49**	39	39	11	18	24	41	35	29
	Doctorate	6	12	7	14	13	13	4	7	5	8	9	8
	Total	*49*	*100*	*51*	*100*	*100*	*100*	*61*	*100*	*59*	*100*	*120*	*100*

The table 21 reveals the variable-wise frequency and percentage distribution of overall and institute-wise perceptions of respondents regarding the application of GenAI as follows:

Variable-wise perceptions of the respondents for overall and university-specific statistics are as follows:

- Except for the variable program of study, the rest of the variables, viz., age, gender, academic achievement, and knowledge of GenAI, revealed a mixed perceptions trend parallel for favorable and less favorable.
- Age-wise, gender-wise, academic achievement-wise, and knowledge related to GenAI to the mixed perceptions were observed, i.e., both favorable and less favorable data numbers moving in parallel.
- Age wise, overall, the data shows that 54% of students in the middle age range of 21–23 years had favorable perceptions of GenAI applications in higher education, whereas 57% of students in this category had less favorable perceptions. Institute-specific data, revealed the majority of FFCSc, MSU, Gujarat middle-aged students (65%) had less favorable perceptions, followed by less than half (45%) of AAU middle-aged students for the same, while the majority of FFCSc, MSU, Gujarat middle-aged students (61%) had favorable perceptions, followed by less than half (48%) of CCSc, AAU, Assam middle-aged students for the same.
- Gender wise, overall, 77% of female students expressed favorable perceptions on the use of GenAI in higher education, compared to 70% who had less favorable perceptions. According to institute-specific data, the majority of FFCSc, MSU, Gujarat female students (84%) and more than half (55%) of CCSc, AAU, Assam female students had less favorable perceptions, while the majority (86%) of FFCSc, MSU, Gujarat female students had favorable perceptions as well, followed by the majority (67%) of CCSc, AAU, Assam female students.
- Academic achievement-wise, overall, 56.7% of moderate achievers' students expressed favorable perceptions on the use of GenAI in higher education, compared to 60% of moderate achievers who had less favorable perceptions Institute specific data revealed, the majority of MSU moderate achievers

(64.7%) and more than half (55%) of AAU moderate achievers had less favorable perceptions while the majority (55%) of moderate achievers had favorable perceptions as well, followed by more than thirty percent of the (35%) of CCSc, AAU, Assam moderate achievers.

- Knowledge related to GenAI overall, the data shows that the majority (60%) of knowledgeable students had favorable perceptions of GenAI applications in higher education, against the majority (67%) of also of them also had less favorable perceptions Institute-specific data revealed that the majority (67%) of CCSc, AAU, Assam knowledgeable students expressed favorable perceptions on the applications of GenAI in higher education, followed by slightly more than half of (53%) FFCSc, MSU, Gujarat knowledgeable students for the same. Strangely, again equal percentage (69%) of knowledgeable students of CCSc, AAU, Assam, and FFCSc, MSU, Gujarat middle-aged students (61%) had less favorable perceptions for the same.
- According to the variable programme of study, overall data revealed that, majority (63%) of undergraduate students had favorable perceptions on GenAI applications in higher education, based on the respondents' study program. Based on data particular to the institution, opposite trend was observed where high majority (75%) of CCSc, AAU, Assam undergraduate students had a favorable Perceptions about the use of GenAI in higher education, whereas slightly less than half (49%) of FFCSc, MSU, Gujarat postgraduate students had unfavorable perceptions for the same.

Table 22: Mann-Whitney U Test Shows Variable-wise Differences in the overall Perceptions of the Selected Students regarding the Applications of GenAI tools in Higher Education

S. No.	Variables	Category	N			Mean Rank			Mann-Whitney U			P-value			Remarks		
			AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total
1	Gender	Male	42	16	58	51.29	59.59	107.43	1251.0	686.5	4520.0	0.275	0.578	68	Not significant	Not significant	Not significant
		Female	68	94	162	58.1	54.8	111.6									
		Total	**110**	**110**	**220**												
2	Knowledge related to GenAI	Knowledgeable	75	66	141	53.95	51.16	104.81	1196.5	1165.5	4767.5	0.456	0.080	0.076	Not significant	Not significant	Not significant
		Less Knowledgeable	35	44	79	58.81	62.01	120.65									
		Total	**110**	**110**	**220**												

***p value significant at <0.05**

The above table 22 indicates that there were no significant differences in the overall perceptions of the application of GenAI in higher education, irrespective of all the respondents of the study, as well as institute-specific of them according to their gender and knowledge related to GenAI. It means that, regardless of gender or knowledge related to GenAI, respondents similarly perceive the potential applications of GenAI in higher education, including those from CCSc of Assam, FFCSc of MSU, in the present study. Thus, pertinent null hypotheses, which stated no significant variations in respondents' overall perceptions of respondents, whether overall or institute specific, regarding the application of GenAI tools in higher education based on their gender and knowledge related to GenAI, are retained. The above findings indicate that respondents' perceptions remain similar despite differences in demographic variables, such as gender and knowledge related to GenAI for higher education.

The probable reason could be that, because technology is gender neutral, its benefits are equally accessible to all users, regardless of gender or prior knowledge; this likely explains the similar perceptions of various variables, such as gender and knowledge related to GenAI for higher education.

So, the core functionalities of GenAI tools, such as summarizing texts or generating ideas, remain neutral in their application, allowing all genders to derive similar benefits. This suggests that the biases inherent in AI outputs influence perceptions but not necessarily the practical usage of these tools in educational contexts, due to which probably no difference gender-wise was prevalent in this study either.

Empirical support of the research on "How Higher Education Can Realize the Potential of Generative AI", 2024, the participants of this study recognized how GenAI applications enhance their knowledge, understanding, and cognitive development by streamlining academic tasks and improving learning outcomes (Deloitte Insights, 2024; EDUCAUSE Review, 2023).

According to the research conducted by Møgelvang et al. (2024) research, there were no significant gender differences in perceptions of GenAI chatbot integration or training in higher education courses. All genders expressed concerns about the potential loss of independent thinking and ethical use, highlighting that these apprehensions are universal rather than gender-specific.

According to the research of UNESCO, 2024 highlights that while generative AI (GenAI) systems may embed regressive gender stereotypes in their outputs, such as assigning stereotypical roles based on gender, these biases do not

significantly impact how men and women use these tools for academic purposes. https://www.unesco.org/en/articles/generative-ai-unesco-study-reveals-alarming-evidence-regressive-gender-stereotypes

According to the research conducted by Saúde et al., 2024, highlighted that students' perceptions of GenAI found no significant correlation between prior knowledge about AI and its perceived usefulness in academic tasks. Instead, students across all knowledge levels reported similar benefits from using GenAI for productivity and learning enhancement. (https://www.mdpi.com/2076-0760/13/8/410 & https://www.mdpi.com/2227-7102/13/9/ 856).

According to the research conducted by Ahn, 2024 and Saúde et al., 2024b this could be because of the intuitive design and user-friendliness of these tools likely account for this; even novice users can quickly adapt and utilize them effectively. (https://www.mdpi.com/2071-1050/16/20/9066 & https://www.mdpi.com/ 2076-0760/13/8/410)

So, it indicates that the perceived utility of GenAI is not contingent on prior expertise but on its ability to cater to diverse user needs through accessible interfaces and functionalities.

These arguments highlight that, while biases and knowledge gaps exist in GenAI systems, they do not significantly affect practical usage patterns or perceived usefulness across different demographics in higher education.

The reason may also be that Generative AI tools are designed to be broadly accessible and user-friendly, making them equally available to individuals across genders and levels of prior knowledge. Platforms like ChatGPT, Gemini and others cater to diverse users without requiring advanced technical expertise, thereby leveling the playing field in terms of usage and application in education.

(https://er.educause.edu/articles/2024/8/leveraging-generative-ai-for-inclusive-excellence-in-higher-education & https://www.mdpi.com/2076-0760/13/8/410)

The above findings imply that selected universities in the north-east and western regions should prioritize equitable access to training programs for all students, irrespective of their gender or prior knowledge of GenAI. These programs should focus on fostering ethical awareness and critical evaluation skills.

Table 23: Kruskal-Wallis Test Shows Variable-wise Differences in the overall Perceptions of the selected Students regarding the applications of GenAI tools in Higher Education

S. No.	Variables	Category	N			Mean Rank			Std. Deviation			P-value			Remarks		
			AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total
1	Age	Younger	44	31	75	58.86	55.6	115.04	7.534	9.512	8.561	0.659	0.977	0.557	Not Significant	Not Significant	Not Significant
		Middle	53	69	112	53.5	55.17	108									
		Old	13	10	23	52.27	57.5	108.96									
		Total	**110**	**110**	**220**												
2	Program of study	UG	75	49	124	58.97	61.13	119.63	7.534	9.512	8.561	0.236	0.224	0.097	Not Significant	Not Significant	Not Significant
		PG	25	49	74	49.04	50.01	188.47									
		Doctorate	10	12	22	45.6	54.92	101.09									
		Total	**110**	**110**	**220**												
3	Academic achievement	Low achievers	9	12	21	69.67	60.13	127.81	7.534	9.512	8.561	0.184	0.821	0.238	Not Significant	Not Significant	Not Significant
		Moderate achievers	62	66	128	57.27	55.67	112.27									
		High achievers	39	32	71	49.42	53.41	102.19									
		Total	**110**	**110**	**220**												

***p value significant at <0.05**

Table 23 indicates that there were no significant differences in the overall perceptions of the respondents towards the application of GenAI in higher education, irrespective of all the respondents, as well as institute-specific of them based on their age, programme of study, and academic achievement. So, it can be interpreted from the above findings that irrespective of young, middle, or older age groups, undergraduate, postgraduate, or Ph.D. program respondents, low, moderate, or high achievers, all of them perceive similarly the application of GenAI in higher education, of these also CCSc, AAU and FFCSc of MSU students. Thus, pertinent null hypotheses, which stated no significant variations in respondents 'perceptions towards application of GenAI based on their variables viz, age, programme of study, and academic achievement, are accepted. So, it can also be inferred from the above findings that the perceptions of overall students remain similar even though there are differences in demographic variables like age, programme of study, and academic achievement.

This similarity may be because of several reasons, like, in academic settings, the applications of GenAI, such as text summarization or grammar correction, are neutral and do not inherently favor any demographic group. This neutrality ensures that whether benefits or concerns related to the application of GenAI tools are equally relevant to all students (MDPI, 2024). It aligns with the present study's null hypothesis that, age-wise, there are no significant differences in all respondents or even institution-wise regarding the application of GenAI tools in higher education. According to the research conducted by Arowosegbe et al., (2024) revealed no significant differences were revealed in the Perceptions of GenAI benefits based on variables like program of study or academic achievement, but noted a consensus on its utility for enhancing productivity and learning. Saúde et al. (2024c) in their research stated that students across various age groups and educational levels reported similar experiences with GenAI tools because of their intuitive design and broad applicability. https://www.mdpi.com/2076-0760/13/8/410

The likely reason for the no significant differences between the two institutes in home science disciplines, even across five specializations, is that both institutions primarily focus on applied science knowledge. As a result, the

respondents' needs and requirements regarding access to tools and resources may be quite similar. This similarity in access could not lead to comparable outcomes, which may not exhibit drastic differences based on the specific program of study.

Their shared emphasis on applied science knowledge likely explains the observed lack of significant differences among low, moderate, and high achievers across the two institutes in home science disciplines, even within the five specializations. Consequently, the needs and requirements of respondents at all achievement levels may align closely in terms of access to tools and resources. This uniformity in access could result in similar outcomes across different achievement categories, thereby minimizing any substantial differences based on the specific program of study.

The above findings of no significant differences highlight and imply the potential for inclusive AI adoption practices in higher education. Thus, both the universities of Assam and Gujarat can leverage this neutrality to ensure equitable benefits for all students while addressing systemic challenges such as privacy risks.

To foster inclusive growth in home science disciplines, stakeholders should prioritize equitable resource allocation, achievement-tailored instructional strategies, and specialization-specific adaptation by customizing curricula to address the applied science demands of each home science specialization (e.g., nutrition, textiles, child development). By integrating these targeted approaches, educators and policymakers can address diverse learner needs while maintaining the discipline's applied science focus, ultimately creating equitable, dynamic, and outcome-oriented learning ecosystems.

Section C: Perceptions on Benefits Related to the Application of GenAI

4.4 Aspects-wise perceptions of the Respondents Regarding Application of GenAI Tools with reference to variables

4.4.1 Perceptions on Benefits of the Respondents Regarding Application of GenAI tools with reference to variables

Table 24: Frequency and Percentage Distribution of Selected Students' overall Perceptions on Benefits related to the Application of GenAI tools in with reference to variables

(n=220)

Sl. No	Benefits related perceptions of the respondents	AAU		MSU		Total	
		F	%	F	%	F	%
1	Less Benefited	53	48.2	59	**53.6**	112	**50.9**
2	More Benefited	57	**51.8**	51	46.4	108	49.1
	Total	**110**	**100**	**110**	**100**	**220**	**100**

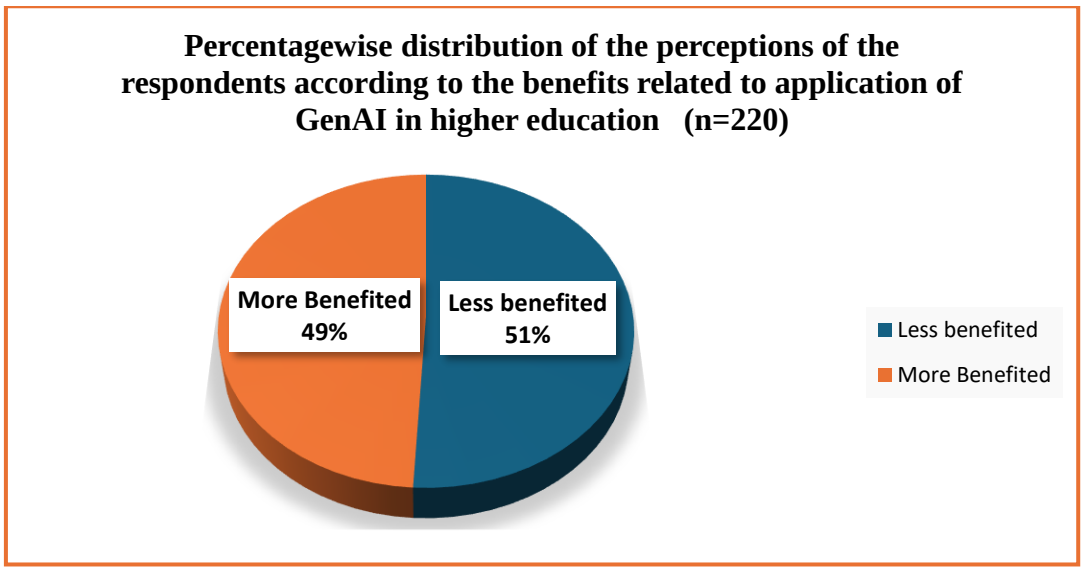


Figure 20: Percentage distribution of the selected students according to the perceptions of benefits related to the application of GenAI into higher education

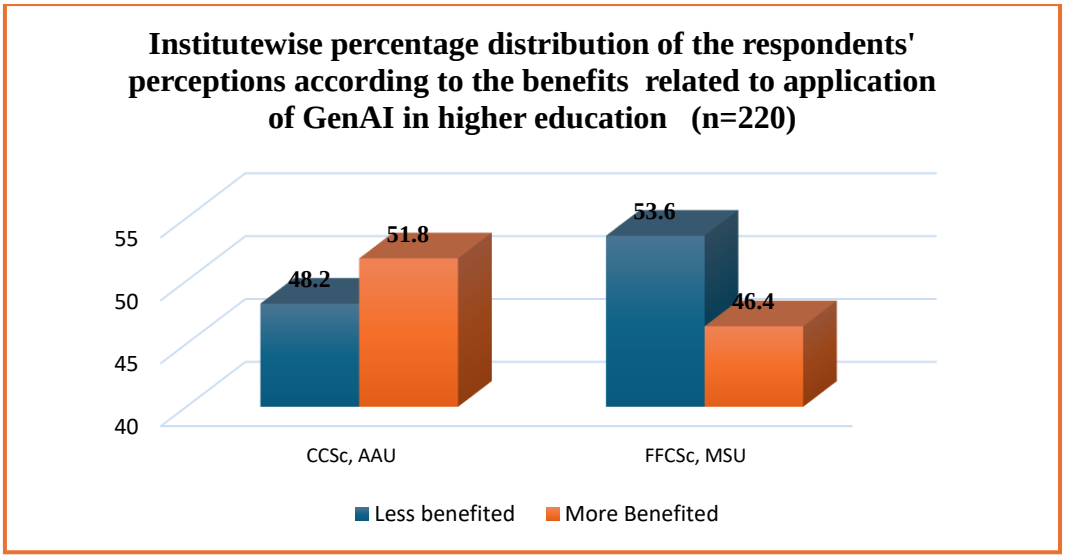


Figure 21: Institute-wise percentage distribution of the selected students according to the Perceptions of benefits related to the application of GenAI into higher education

The frequency and percentage distribution of respondents' perceptions of the benefits associated with the application of GenAI are shown in Table 24 and Figure 20&21. The data show both overall and by institute-specific, i.e., CCSc, AAU, Assam, and FFCSc, MSU, Gujarat details.

These findings show the mixed trend of respondents' perceptions with more benefit and less benefit regarding the application of GenAI tools in higher education with marginal difference. It revealed that overall 49% of respondents 51.8% from CCSc, AAU, Assam, and 46.4% from FFCSc, MSU, Gujarat had perceived more benefit from the applications of Generative AI (GenAI) in education as against 50.9% observing less benefit (53.6% from FFCSc, MSU, Gujarat and 48.2% from CCSc, AAU, Assam) for the same.

So, it can be inferred from the findings that when almost half (49%) of the respondents fell into the more beneficial application of GenAI in education, it indicated a positive trend. However, northeast respondents had perceived GenAI tools with more benefit (51.8%) as compared to western region students (48.2%) of FFCSc, MSU, Gujarat students.

The possible reason for this could be because of the universal feature and benefits of GenAI tools. It gives individuals rapid access to an unlimited amount of information on any kind of subject/topic. It assists a diverse group of students that has different learning styles, language backgrounds and accesibility requirements.

Further, encourage curiosity, promote new ideas and ways of thinking, and speed up creativity and exploration. When such benefits are offered just on one click by GenAI tools like ChatGPT, Gemini, Meta and others, the respondent could perceive the application of GenAI tools in higher education with more benefit.

Research indicates rapid expansion of generative AI (GenAI) adoption in education worldwide. For instance, a UK government study found that 74% of online learners aged 16–24 utilize GenAI tools for academic. This growth aligns with evidence that AI-driven personalized learning enhances engagement and outcomes through tailored content adaptations, as demonstrated in the same DfE report analyzing educator experiences with formative feedback systems. (Department for Education. (2024). Use cases for generative AI in education: User research report. (https://www.ai-in-education.co.uk/news-events/dfe-generative-ai-in-education-report)

However, institute-wise variation between CCSc, AAU, Assam (51.8%) and FFCSc, MSU, Gujarat (46.4%) could be because of state-wise differences in the culture and pedagogy. Moreover, the differences in institutional readiness or limited digital infrastructure availability/accessibility by the respondents of the study could also be the reason for the same. The same table also shows that a higher percentage (53.6%) of FFCSc, MSU, Gujarat students perceive application of GenAI tools in higher education with less benefit as compared to those from CCSc, AAU, Assam (48.2%) for the same.

Sallam et al. (2024) found in their research that lower perceived risks and higher institutional support directly correlate with positive GenAI attitudes. So, this may indicate that Assam's higher education policies mirror these enablers, while Gujarat's lagging initiatives align with resistance as far as GenAI's application in higher education is concerned. (https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2024.1414758/full)

Cano & Nunez, (2024) in their research stated that, on business students revealed that perceived enjoyment significantly influences the intention to use GenAI tools, surpassing even perceived usefulness. This suggests that regions or institutions fostering enjoyable and user-friendly GenAI experiences may see higher adoption rates. (https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2024.1483853/full)

Thus, the slightly higher adoption rate at CCSc, AAU, Assam, could be due to proactive institutional strategies or cultural factors promoting innovation. Conversely, FFCSc, MSU, Gujarat's lower rate might indicate a need for targeted awareness campaigns or infrastructure improvements.

The above findings show that, despite concerns, students recognize the importance of acquiring GenAI skills could be because of future employment requirements. Thus, both educational institutions must balance these apprehensions by fostering technical proficiency alongside ethical awareness. For instance, Singapore's approach integrates critical thinking with GenAI literacy, demonstrating positive outcomes for student preparedness.

4.4.2 Differences in the Perceptions on Benefits of the Respondents with References to The Selected Variables Regarding Application of GenAI Tools in Higher Education

Table 25: Mann-Whitney U Test Showing Aspect-wise (benefits) Differences in the Perceptions of the Selected Students regarding the Applications of GenAI tools in Higher Education

Sl. no.	Variables	Category	N			Mean Rank			Mann-Whitney U			P-value			Remarks		
			AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total
1.	Gender	Male	42	16	58	50.82	44.66	99	1231.5	578.5	4030.5	0.224	0.139	0.107	Not significant	Not significant	Not significant
		Female	68	94	162	58.92	57.35	114.62									
		Total	**110**	**110**	**220**												
2.	Knowledge related to GenAI	Knowledgeable	75	66	41	54.07	57.53	105.54	1205.5	1191.5	4869.5	0.490	0.110	0.121	Not significant	Not significant	Not significant
		Less Knowledgeable	35	44	79	58.56	61.42	119.36									
		Total	**110**	**110**	**220**												

***p value significant at <0.05**

The above table 25 indicates that there were no significant differences in the overall Perceptions of benefits of all the respondents, as well as institute-specific respondents regarding the application of GenAI in higher education, according to their gender and knowledge related to GenAI. So, as per the above findings, irrespective of male, female, less knowledgeable to knowledgeable respondents, all the respondents and institute specific respondents, similarly perceive the potential applications of GenAI in higher education. Thus, pertinent null hypotheses, which stated no significant differences in respondents' perceptions of benefits regarding the application of GenAI tools in higher education based on their gender and knowledge related to GenAI, are accepted. So, it can also be interpreted for the above findings that the Perceptions of benefits of respondents remain similar even though there are differences in variables like gender, knowledge related to the application of GenAI tools in higher education irrespective of northeast or western region students.

The probable reason for above finding could be because of societal tendencies that support gender neutrality in tech literacy. Following empirical evidence supports the present study findings.

A survey conducted by Cengage in mid-2023 reveals nuanced perspectives among U.S. higher education instructors regarding Generative AI (GenAI). Key benefits of using GenAI as indicated in the results include automating administrative tasks to free up time for teaching, enhancing efficiency (52%), boosting creativity (42%), and supporting language learners. Common applications include creating assessments, detecting cheating, and supplementing lectures. However, only 33% of instructors allow students to use GenAI for graded assignments.

According to a survey conducted in 2023 in the United States, 85 percent of undergraduate students said that they would feel more comfortable using artificial intelligence (AI) tools if trusted academic sources developed and vetted them. 65 percent also agreed that AI will improve how students learn rather than have negative consequences on learning.

https://www.statista.com/statistics/1445975/us-undergraduate-students-opinions-on-the-use-of-ai-in-education/

Chan & Hu, (2023) in their research, undertook a poll of 399 university students from various fields in Hong Kong (2023), who discovered no discernible gender disparities in their opinions about the educational usefulness of GenAI.

Similar study of Chan & Hu (2023), even though 62% of students with high GenAI literacy were aware of its efficiency improvements, they nevertheless avoided utilizing it for assignments because they were worried about originality penalties. This demonstrates how adoption habits are mostly shaped by institutional grading patterns and the stigma associated with AI-assisted labor, rather than knowledge deficiencies. (https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-023-00411-8)

Another explanation could be that university students, who were exposed to AI-driven platforms in their early schooling, may have more consistent views on new technologies like GenAI, since they are digital natives. Above findings imply that both north-eastern and western region universities can implement uniform policies regarding GenAI use, exposing all students, regardless of gender or knowledge level, to similar guidelines or extracting benefits by navigating and integrating it in curricula. This standardization will ensure that potential benefits will be there and will be consistent across demographic groups.

Given the study's focus on home science, a field historically associated with women, there is a potential for skewed representation, and therefore, the study anticipates no significant gender differences. However, contradictory facts are observed which reveal that, despite India's growing prominence in AI, women are underrepresented in generative AI (GenAI) (Shinde, 2025). Coursera data indicates that while India ranks second globally in GenAI enrolments among women, they only constitute 29.6% of total GenAI enrollments in the country, even though they represent 40% of all learners on the platform (Shinde, 2025). This disparity is attributed to factors such as lack of confidence, time constraints due to balancing caregiving and work, and the absence of female role models in AI (Shinde, 2025). Addressing these barriers is crucial to ensuring equitable access and diverse contributions to the AI field (Shinde, 2025). (https://www.business-standard.com/industry/news/india-leads-global-genai-adoption-but-women-s-participation-remains-low-125030600478_1.html)

So, the above findings imply that, since generative AI is still in its developmental phase at both institutes, students are not yet fully proficient in utilizing it for academic purposes. However, with adequate training and exposure, they could develop more favorable perceptions of its applications and benefits.

Table 26: Kruskal-Wallis Test Showing Aspect-wise (benefits) Differences in the Perceptions of the Selected Students regarding the applications of GenAI tools in Higher Education

SL. No.	Variables	Category	N			Mean Rank			Std. Deviation			P-value			Remarks		
			AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total
1.	Age	Younger	44	31	75	60.68	54.45	115.07	5.649	6.531	6.096	0.376	0.771	0.631	Not Significant	Not Significant	Not Significant
		Middle	53	69	112	52.41	56.85	109.45									
		Old	13	10	23	50.58	49.45	101.28									
		Total	**110**	**110**	**220**												
2.	Program of study	Undergraduate	75	49	124	56.93	57.27	113.6	5.649	6.531	6.093	0.536	0.403	0.233	Not Significant	Not Significant	Not Significant
		Post Graduate	25	49	74	55.42	56.59	111.7									
		Doctorate	10	12	22	45.0	43.88	88.77									
		Total	**110**	**110**	**220**												
3.	Academic achievement	Lows achievers	9	12	21	70.94	43.08	108.83	5.649	6.531	6.093	0.311	0.344	0.953	Not Significant	Not Significant	Not Significant
		Moderate achievers	62	66	128	53.8	56.42	109.73									
		High achievers	39	32	71	54.64	58.27	112.39									
		Total	**110**	**110**	**220**												

***p value significant at <0.05**

The above findings as per table 26 of the study, which showed no significant differences among all the respondents and institute specific i.e. from CCSc, AAU, Assam and FFCSc, MSU, Gujarat, as per demographics viz age, program of study, academic achievement could be attributed to the widespread acceptance of the benefits associated with the application of generative AI (GenAI) in academics. So, as per the above findings, irrespective of younger, middle, older, undergraduate, postgraduate, or doctorate, as well as low achievers, moderate achievers, and high achievers, all the respondents perceive similarly the potential applications of GenAI in higher education. Thus, pertinent null hypotheses, which stated no significant variations in respondents' perceptions of benefits regarding application of GenAI tools in higher education based on their age, programme of study, and academic achievements, are accepted. So, it can also be interpreted from the above findings that the Perceptions of benefits of respondents remain similar even though there are differences in variables like age, programme of study, and academic achievements, irrespective of northeast or western region students.

Generative AI tools are designed to be user-friendly and widely accessible, ensuring that students across diverse demographics can utilize them effectively. Tools like ChatGPT are employed for tasks such as grammar correction, idea generation, and personalized learning, which are universally applicable regardless of age, academic program, or achievement level.

Following empirical evidence supports the present study findings.

Arowosegbe et al., 2024b in their research, found that over 80% of students believe GenAI will grow in popularity in academia, with no significant differences in perceptions based on academic achievement or program of study. Although postgraduate students (Master's or Doctoral levels) had somewhat more favourable perspectives of GenAI than undergraduate students, practical requirements explained these differences rather than different perspectives about the technology. (https://doi.org/10.3389/feduc.2024.1463208

According to a Chan & Hu, 2023b in their study, titled "University Students' Perceptions and Use of ChatGPT Generative Artificial Intelligence (AI) in Higher Education," n.d., which surveyed 500 students from different

universities in Region XI, the Philippines, opinions about GenAI were the same, irrespective of academic performance levels. Despite having some worries about ethical issues, including prejudice and abuse, students showed a high degree of comprehension and a desire to utilize GenAI technologies. The study showed no significant differences in the perceptions of low, moderate, and high performers, as all three groups highlighted both the advantages (like faster assignment completion) and disadvantages (such as potential misuse). This shows that sentiments regarding GenAI are not significantly influenced by academic attainment.

(https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-023-00411-8 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4724968)

In a nutshell, the absence of significant differences in benefits-related perceptions across age, programme of study, and academic achievement underscores the systemic nature of potential associated with generative AI in higher education. Institutions must adopt universal strategies to navigate these shared benefits while fostering responsible use and maximizing the benefits of this transformative technology.

Section D: Perceptions of Concern Related to the Application of GenAI Tools

4.4.3 Perceptions of Concerns of the Respondents Regarding Application of GenAI Tools regarding selected variables

Table 27: Frequency and Percentage Distribution of Perceptions on Concern related to the Application of GenAI Tools

(n=220)

S. No	Concerns of GenAI	AAU		MSU		Total	
		F	%	F	%	F	%
1	Less concerned	48	43.6	48	43.6	96	43.6
2	More concerned	62	**56.4**	62	**56.4**	124	**56.4**
	Total	**110**	**100**	**110**	**100**	**220**	**100**

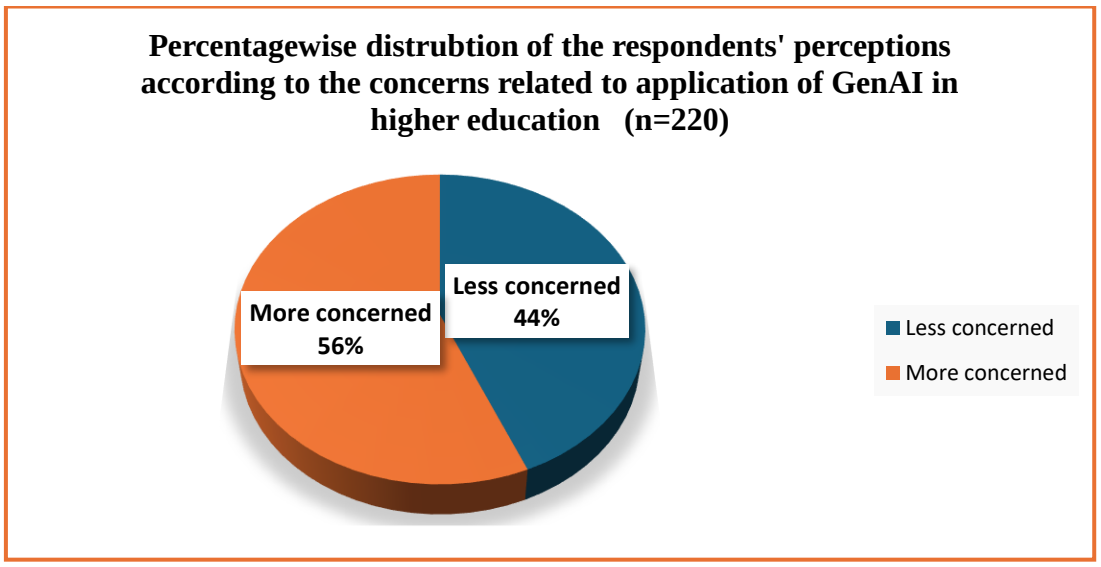


Figure 22: Percentage distribution of the selected students according to the perceptions of concerns related to the application of GenAI in higher education

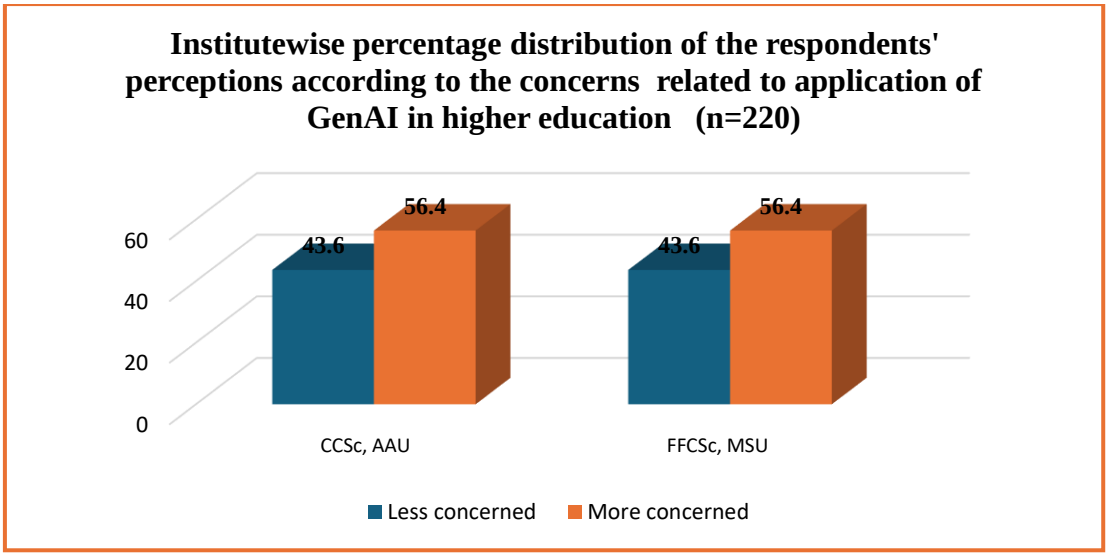


Figure 23: Institute -wise percentage distribution of the selected students according to the perceptions of concerns related to the application of GenAI in higher education

According to Table 27 and Figure 22 & 23, the percentage-wise distribution of overall and institute-specific respondents' perceptions of concern over the use of GenAI is represented.

Overall and institute-specific statistics provide a similar picture of the areas of GenAI application in higher education that are more as well as less concerning. The overall data indicates that just over half (56.4%) of the respondents fell into the category of being more concerned. On the other hand, interestingly, for both university students, i.e., from CCSc, AAU, Assam, and FFCSc, MSU, Gujarat, also showed an equal percentage of this group of being more concerned. The remaining students (43.6%) were less concerned with the use of GenAI in education overall and at the university level. So, the above findings of 56.4% of students were more concerned about the use of generative AI (GenAI) in education, while 43.6% were less concerned, reflecting a nuanced landscape of perceptions toward this technology. Both perceived benefits and potential risks could shape these perceptions.

Further, the finding that students from both CCSc, AAU, Assam, and FFCSc, MSU, Gujarat demonstrated equal levels of concern about generative AI (GenAI) in education, with 56.4% being more concerned, reflects broader trends in student perceptions toward this emerging technology. Above findings

of equal level of concerns by both institute respondents' could be because of common challenges in higher education, lack of clear university policy and guidelines, digital inequity, the equal levels of concern by all the respondents highlight a shared apprehension among students, irrespective of geographic or institutional differences and shared apprehensions about GenAI's implications for education. This underscores the need for a universal approach to addressing GenAI-related challenges.

The probable reasons could be ethical concerns, data privacy, accuracy, as well as fearing misuse of their personal information when interacting with AI platforms are some of the prevalent concerns when individuals use GenAI tools in education. Concerns regarding academic malpractice facilitated by generative AI (GenAI), such as plagiarism and over-reliance on AI tools for assignments, are significant. These practices have the potential to undermine the value of university education and pose ethical dilemmas. Institutions are increasingly grappling with these challenges as they seek to maintain academic integrity and adapt to the evolving role of AI in education (Jisc, 2025).

UNESCO emphasizes the need to protect intellectual skills and human agency by selectively limiting GenAI use in situations where it might compromise cognitive development. (North, 2023a)

(https://www.weforum.org/stories/2023/09/generative-ai-education-unesco/)

Many students feel unprepared to use GenAI responsibly because of insufficient training or institutional guidelines. This uncertainty leads to apprehension about unintentionally violating university policies on AI use. Educators also face challenges in integrating GenAI effectively because of poor digital infrastructure and limited knowledge. (North, 2023b)

(https://www.weforum.org/stories/2023/09/generative-ai-education-unesco/)

Francis et al., 2024, in their research, students acknowledge the potential advantages of GenAI for individualized instruction and assistance, but they also voice doubts about its practical use. (https://febs.onlinelibrary.wiley.com/doi/10.1002/2211-5463.13936)

According to Baytas & Ruediger, 2024 and Generative AI in Higher Education, n.d. in their research, students have raised important ethical concerns regarding the use of generative AI (GenAI), particularly about bias and fairness. A report

indicates that students are calling for clearer institutional guidelines to facilitate the responsible integration of AI technologies in educational settings. They express particular worry that AI-generated content may disproportionately disadvantage specific groups, including neurodiverse individuals and non-native English speakers. This growing awareness of ethical implications contributes to a general skepticism about the widespread application of GenAI in higher education.

(https://sr.ithaka.org/publications/generative-ai-in-higher-education/)

Thus, addressing these concerns requires both universal policies that ensure fairness and ethical use of institutions and state-specific measures tailored to local challenges, such as digital inequity or industry collaboration opportunities. By taking proactive steps, universities can empower students while mitigating risks associated with this transformative technology. So, while a significant portion of students are concerned about GenAI in education, these concerns highlight areas where institutions can intervene to maximize benefits while mitigating risks. Addressing these issues thoughtfully will be key to ensuring that GenAI serves as a transformative tool rather than a disruptive force in education.

These findings imply that, to promote more favorable perceptions of GenAI among students, higher education institutions need to take proactive measures to solve these issues. Both the universities can -

- Create Clear Policies and Standard Operating Procedures on the use of GenAI in higher education. To allay concerns about academic bias and honesty, institutions can create clear principles for the moral use of GenAI.
- Further giving students and staff thorough instruction and training on how to use GenAI tools will help allay their fears and boost their self-assurance while utilizing these tools.
- Educational institutions can more effectively incorporate GenAI into their courses while upholding academic integrity and encouraging fair learning opportunities by directly addressing these issues.

4.4.4 Differences in the Perceptions of Concerns of the Respondents with References to the Selected Variables Regarding Application of GenAI Tools in higher Education

Table 28: Mann-Whitney U Test Showing Aspect-wise (Concern) Differences in the Perceptions of the Selected Students regarding the Applications of GenAI tools in Higher Education

Sl. No.	Variables	Category	N			Mean Rank			Mann Whitney U			P-value			Remarks		
			AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total
1.	Gender	Male	42	16	58	52.83	69.16	115.25	1316.0	533.5	4422.5	0.459	0.063	0.506	Not Significant	Not significant	Not significant
		Female	68	94	162	57.15	53.18	108.8									
		Total	**110**	**110**	**220**												
3.	Knowledge related to GenAI	Knowledgeable	75	66	141	56.61	55.32	111.73	1229.0	1440.0	5395.5	0.590	0.941	0.700	Not significant	Not significant	Not significant
		Less Knowledgeable	35	44	79	53.11	55.77	108.3									
		Total	**110**	**110**	**220**												

***p value significant at <0.05**

The above table 28 indicates that there were no significant differences in the Perceptions of concerns of all the respondents, as well as institute-specific, viz., CCSc, AAU, and FFCSc, MSU, on application of GenAI in higher education according to their gender and knowledge related to GenAI. So, it can be interpreted from the above findings that, irrespective of male, female, less knowledgeable to knowledgeable respondents, all of them irrespective of institute specific too, similarly perceived the potential applications of GenAI in higher education. Thus, the pertinent null hypothesis, which stated no significant variations in respondents' perceptions of concerns regarding the application of GenAI tools in higher education based on their gender and knowledge related to GenAI, are accepted. So, it can also be inferred from the above findings that the Perceptions of concerns of respondents remain similar, even though there are differences in variables like gender, knowledge related to the application of GenAI tools in higher education. This may similarly be because of many reasons and emerging factors.

Following empirical evidences support the above findings of the present study.

Møgelvang et al., 2024b in their research found no significant gender differences were found in perceptions of GenAI chatbot integration or training in higher education courses. All genders expressed concerns about the potential loss of independent thinking and ethical use, highlighting that these apprehensions are universal rather than gender-specific.

(https://www.mdpi.com/2227-7102/14/12/1363)

Privacy issues are a major concern for all users of GenAI tools, irrespective of their demographic characteristics or expertise. The BIS (2024) study on the "GenAI gender gap" revealed that both men and women share apprehensions about data privacy when using GenAI tools. Similarly, knowledge gaps do not significantly alter these concerns, as even experienced users recognize the risks associated with data sharing. (Iñaki Aldasoro et al., 2024)

(https://www.bis.org/publ/work1197.htm)

Arowosegbe et al., 2024c in their research, found that plagiarism (33%), privacy issues (14%), and lack of clarity from universities (13%) were the top concerns among students across all demographic groups. These issues are not tied to specific variables of gender or knowledge related to GenAI but are instead a reflection of broader uncertainties about integrating GenAI into academia.

(https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2024.1463208/full)

According to Ruiz-Rojas et al. (2024) participants with prior knowledge and experience with these technologies perceived low concern regarding academic and collaborative work, which contradicts the findings of the current study. (https://www.mdpi.com/2071-1050/16/13/5367)

Above findings imply that addressing students' concerns about plagiarism and enhancing training programs on GenAI could improve perceptions of its value in education. Institutions may need to implement clearer guidelines on the ethical use of GenAI and provide comprehensive training to help students understand how to integrate these tools into their academic work effectively. By doing so, both the universities viz northeast region and the western regions, can reduce concerns and foster a more positive outlook on the role of GenAI in enhancing educational outcomes.

Table 29: Kruskal Wallis Test Showing Aspect-wise (Concern) Differences in the Perceptions of the Selected Students regarding the Applications of GenAI Tools in Higher Education

SL. No.	Variables	Category	N			Mean Rank			Std. Deviation			P-value			Remarks		
			AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total	AAU	MSU	Total
1.	Age	Younger	44	31	75	60.68	59.81	114.98	4.395	5.765	5.115	0.909	0.672	0.719	Not Significant	Not Significant	Not Significant
		Middle	53	69	122	52.41	53.84	107.49									
		Old	13	10	23	50.58	56.60	111.85									
		Total	**110**	**110**	**220**												
2.	Program of study	Undergraduate	75	49	124	57.61	63.03	119.52	57.85	57.78	57.82	0.562	0.034	0.025	Not Significant	Not Significant	Not Significant
		Post Graduate	25	49	74	49.86	46.77	94.39									
		Doctorate	10	12	22	53.75	60.42	113.86									
		Total	**110**	**110**	**220**												
3.	Academic achievement	Low achievers	9	12	21	57.67	69.29	128.33	4.395	5.765	5.115	0.678	0.228	0.238	Not Significant	Not Significant	Not Significant
		Moderate achievers	62	66	128	57.45	55.24	112.02									
		High achievers	39	32	71	57.9	50.86	102.48									

***p value significant at <0.05**

The above table 29 indicates that there were no significant differences in the Perceptions of concerns of the respondents on the application of GenAI tools in higher education according to their age, program of study, and academic achievement. So, it can be interpreted from the above findings that, irrespective of younger, middle, and older, undergraduate, postgraduate, doctorate, and low achievers, moderate achievers, and high achievers respondents, all of them perceived similarly the potential applications of GenAI tools in higher education. Thus, the pertinent null hypothesis, which stated no significant variations in respondents' perceptions of concerns regarding the application of GenAI tools in higher education based on their age, program of study, and academic achievement, are accepted. So, it can also be inferred from the above findings that the perceptions on concerns of respondents remain similar, even though there are differences in variables like gender, knowledge related to the application of GenAI tools in higher education.

Following empirical evidences support the above findings of the present study.

The widespread accessibility and use of GenAI tools ensure that students across different demographics face similar challenges. Tools like ChatGPT are used for common academic tasks such as grammar correction, idea generation, and research assistance. Since these tools are not tailored to specific groups or fields of study, the concerns related to their application remain consistent across age groups, disciplines, and academic performance levels (MDPI, 2024).

Ethical dilemmas, such as the potential for cheating or over-reliance on AI tools, are universal concerns in academia. These issues resonate with all students because they challenge fundamental principles of academic integrity regardless of individual characteristics (UNESCO, 2024).

Concerns about GenAI are not significantly influenced by academic performance levels because the challenges posed by these tools, such as the fear of plagiarism detection or misuse, effect-achieving and low-achieving students alike (*MDPI*, 2024). The Perceptions that GenAI might undermine critical thinking skills are shared broadly across achievement levels.

Students with varying levels of knowledge about GenAI share similar concerns related to trust, privacy, and ethical use. Møgelvang et al. (2024c) in their research stated that, even students with advanced knowledge of GenAI tools expressed reservations about trusting AI-generated outputs and avoiding plagiarism. This suggests that familiarity with the technology does not necessarily mitigate concerns but reinforces awareness of its limitations and risks.

The findings suggest a need for institutions to create universal policies addressing ethical use, plagiarism detection, and data privacy related to GenAI. These policies should be transparent, easily accessible, and applicable across all disciplines to address shared concerns effectively.

Institutions should prioritize integrating ethical AI literacy into curricula for all students, irrespective of their field or level of study. Workshops and training programs can help demystify GenAI tools while addressing common concerns, such as plagiarism and privacy. Since concerns are shared across demographic groups, universities should ensure equitable access to resources as AI training modules or ethical guidelines, to empower all students equally. To mitigate fears about over-reliance on AI tools, educators should focus on fostering critical thinking skills alongside AI usage. For example, assignments could require students to critically evaluate AI-generated outputs rather than passively accept them.

The universal nature of concerns highlights the need for collaborative efforts between universities to develop standardized frameworks for integrating GenAI responsibly into higher education.

Addressing these shared concerns is crucial for safeguarding academic integrity while ensuring that students can benefit from the transformative potential of GenAI without compromising ethical standards.

The no significant differences in concern-related perceptions reflect the systemic nature of challenges associated with generative AI in higher education. Institutions must adopt universal strategies to address these shared apprehensions while fostering responsible use and maximizing the benefits of this technology.

As per the study titled “Student Perceptions on Generative AI”, (2024), in which 171 students from 17 countries, revealing that perceptions of generative AI (GenAI) tools did not significantly differ across age groups. While younger students exhibited slightly greater enthusiasm for using GenAI, their concerns about academic integrity and ethical implications were similar to those of older students. This finding indicates that age is not a critical factor in shaping perceptions of GenAI, as shared concerns about its impact on learning and integrity dominate across all age demographics (Prather et al., 2023). https://www.uu.nl/en/research/generative-ai-for-computing-education/toolkit-for-teachers/student-Perceptionss-on-genai)

Johnston et al., 2024 in their research, found that postgraduate students from Humanities and Social Sciences faculties exhibited higher confidence in aspects such as referencing, understanding plagiarism, and concerns about academic misconduct. Consequently, these students demonstrated greater confidence in using generative AI technology compared to other university students. However, this finding contrasts with the results of the current study, which suggests differing levels of confidence among students regarding generative AI use.https://edintegrity.biomedcentral.com/articles/10.1007/s40979-024-00149-4

A survey conducted by Cengage in mid-2023 reveals nuanced perspectives among U.S. higher education instructors regarding Generative AI (GenAI). While 82% of respondents acknowledge its growing importance in education, concerns about academic integrity, quality of learning, and its impact on teaching roles persist. Barriers to adoption include lack of training (62%), insufficient knowledge about the technology (42%), and concerns about reliability (54%). Additionally, 80% of instructors report their institutions lack clear GenAI policies, highlighting a need for institutional support and training programs. Ethical concerns remain significant, with 84% citing academic integrity risks, followed by worries about inaccurate outcomes (52%) and potential bias (40%). Instructors emphasize the importance of monitored systems, adherence to ethical codes, and transparent AI standards to build trust. The findings underscore the need for collaboration among educators, administrators, and policymakers to harness GenAI responsibly while addressing its challenges. https://www.cengagegroup.com/news/perspectives/2023/higher-ed-gen-ai-faculty-research-findings/

Abbas et al. (2024) in their research, found that students facing high academic workloads and time pressure were more likely to use generative AI tools, such as ChatGPT, to manage their tasks. In contrast, students who were more sensitive to rewards demonstrated lower usage of generative AI, possibly because of concerns about academic penalties if caught. This suggests that reward-sensitive students may avoid using such technology out of fear of receiving poor grades, a finding that contradicts the results of the current study.

https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-024-00444-7

Thus, from above results, institute wise findings can be interpreted that because of the lack of significant demographic differences in the findings may be attributed to the respondents from CCSc, AAU, Assam, and FFCSc, MSU, Gujarat sharing common concerns about the application of generative AI (GenAI), primarily because of limited knowledge, experience, and access to training programs. Additionally, the absence of clear governmental guidelines and ethical frameworks for GenAI usage likely contributes to this uniformity in perceptions.

These observations underscore the need for respondents to enhance their understanding of GenAI by undergoing targeted training programs that provide practical experience. Furthermore, the development and implementation of comprehensive policies and ethical guidelines at the national level are essential to ensure responsible use of GenAI in academic and professional contexts.

These findings imply that educational institutions should focus on addressing common concerns related to GenAI, rather than tailoring interventions based on demographic variables like age or academic standing. By fostering an environment that emphasizes ethical use, transparency, and comprehensive training on GenAI applications, universities can enhance student engagement with these technologies across all demographics. Ultimately, a unified approach to addressing ethical concerns may be more effective than attempting to differentiate strategies based on age or academic achievement levels.

Section E: Suggestions to Integrate the Application of GenAI Tools

4.5 Suggestions to Integrate The Applications of GenAI Tools

Table 30: Percentage Distribution and Intensity Indices according to the Extent to which the Respondents Expressed Suggestions to Integrate the Application of GenAI tools in higher education

(n = 220)

Sl. No.	Suggestions of the respondents	AAU				MSU				Total			
		Low Extent (%)	Some Extent (%)	Great Extent (%)	Intensity Indices	Low Extent (%)	Some Extent (%)	Great Extent (%)	Intensity Indices	Low Extent (%)	Some Extent (%)	Great Extent (%)	Intensity Indices
1	There should be clear ethical policies on data handling when using AI tools in education.	1.8	16.4	81.8	2.8	1.8	27.3	70.9	2.7	1.8	21.8	76.4	2.7
2	GenAI creators should have control over how their work is used by AI system.	3.6	18.2	78.2	2.7	3.6	28.2	68.2	2.6	3.6	23.2	73.2	2.7
3	Educational institutions should provide guidelines for the ethical use of GenAI tools by students and faculty alike	2.7	20	77.3	2.7	8.2	22.7	69.1	2.6	8.5	21.4	73.2	2.6
4	Regular trainings, workshops or seminars on responsible Al usage should be mandatory for all students entering in higher education programs	10	48.2	41.8	2.3	12.7	44.5	42.7	2.3	11.4	46.4	42.3	2.3
5	Students should develop Al literacy skills to critically evaluate Al-generated content and understand its limitations.	9.1	50	40.9	2.3	13.6	46.4	40	2.3	11.4	48.2	40.5	2.3

6	Guidelines should be designed by policy makers for equitable access to Al tools and resources across different institutions and student populations.	5.5	55.5	39.1	2.3	15.5	49.1	35.5	2.2	10.5	52.3	37.3	2.3
7	Comprehensive Al ethical programs should be established by higher institutions for responsible Al use across the institution	2.7	64.5	32.7	2.3	12.7	51.8	35.5	2.2	7.7	58.2	34.1	2.3
8	Higher educations should redesign curricula and assessments to incorporate Al tools while maintaining academic integrity	4.5	60	35.5	2.3	10.9	56.4	32.7	2.2	7.7	58.2	34.1	2.3
9	Responsible integration of generative Al should be taught higher education institutes for innovative educational practices while addressing potential risks effectively	8.2	53.6	38.2	2.3	13.6	52.7	33.6	2.2	10.9	53.2	35.9	2.3
10	Open resources should be made available to help understand the ethical concerns related to generative Al usage	8.2	62.7	29.1	2.2	15.5	49.1	35.5	2.2	11.8	55.9	32.3	2.2
11	Regular conferences/seminars or interactions/discussion forums around generative Al applications should be organized to understand diverse perspectives from various stakeholders. (including students, educators, and policymakers).	3.6	72.7	23.6	2.2	12.7	56.4	30.9	2.2	8.2	64.5	27.3	2.2

The above table 30 reveals suggestions, percentage, and intensity indices of the suggestions given by the respondents in the applications of GenAI.

Table 30 reveals that high majority of the respondents recommended that university should be provide clear ethical policies on data handling when using Al tools in education (overall 76.4%, and institutes wise 81.8% AAU and 70.9% MSU). A similar table observed its intensity indices overall mean score, which was 2.7, i.e., to a great extent and also university wise mean scores were 2.8 and 2.7 accordingly. It indicates that the selected respondents of the current study highly suggested the statement. Thus, it can be inferred from this finding that, in the technology era it is being seen the applications of Generative Artificial Intelligence in education, but students are concerned about the ethical policies which is reported and strongly reported by a high majority of the respondents with great intensity.

This finding implies that respondents feel that it would be safer when using the GenAI applications in academics for more safe side of data handling. Therefore, university should provide ethical policies on data handling.

The above table also shows that a high majority of the respondents had suggested:

- GenAI creators should have control over how their work is used by AI system. (Overall 73.2%, AAU 78.2% and MSU 68.2%)
- Educational institutions should provide guidelines for ethical use of GenAI tools by students and faculty alike. (Overall 73.2%, AAU 77.3% and MSU 69.1%)

  Intensity indices of these items were ranging almost nearly from 2.7 to 2.6 respectively, i.e., at a moderate level. Thus, it indicates that the selected respondents of the current study moderately recommended above statements.
- Further, the respondents also had recommended–Regular trainings, workshops or seminars on responsible Al usage should be mandatory for all students entering in higher education programs. (Overall 42.3%, AAU 41.8% and MSU 42.7%)

- Students should develop Al literacy skills to critically evaluate Al-generated content and understand its limitations. (Overall 40.5%, AAU 40.9%, and MSU 40%)
- Policymakers should design guidelines for equitable access to Al tools and resources across different institutions and student populations. (Overall 37.3%, AAU 39.1% and MSU 35.5%)
- Higher institutions for responsible AI should establish comprehensive AI ethical programs use across the institution. (Overall 34.1%, AAU 32.7% and MSU 35.5%)
- Higher education should redesign curricula and assessments to incorporate AI tools while maintaining academic integrity. (Overall 34.1%, AAU 35.5%, and MSU 32.7%)
- Responsible integration of generative Al should be taught in higher education institutes for innovative educational practices while addressing potential risks effectively. (Overall 35.9%, AAU 38.2%, and MSU 33.6%)
- Open resources should be made available to help understand the ethical concerns related to generative AI usage. (Overall 32.3%, AAU 29.1%, and MSU 35.5%)
- Regular conferences/seminars or interactions/discussion forums around generative Al applications should be organized to understand diverse perspectives from various stakeholders. (including students, educators, and policymakers). (Overall 27.3%, AAU 23.6% and MSU 30.9%)

  Intensity indices of these items were ranging almost nearly from 2.3 to 2.2, respectively, i.e., at a low level. This indicates that the selected respondents of the current study least recommended the statements.

CHAPTER 5
SUMMARY

CHAPTER 5
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Generative Artificial Intelligence (Generative AI)

Generative AI, a subset of artificial intelligence, focuses on creating original content such as text, images, music, and videos by learning patterns from large datasets. Advanced models like Generative Adversarial Networks (GANs) and transformer-based architectures, such as GPT-4, have significantly enhanced their capabilities. This technology is increasingly shaping various sectors, including education, where it drives transformative changes. Its growing impact underscores its role as a cornerstone of modern AI applications.

5.1.1 GenAI adoption across various industries

Generative AI adoption has surged across industries, with the technology sector leading at an 88% usage rate in 2024. Other sectors, such as professional services, advanced industries, and media and telecom, also report high adoption rates. Implementation trends vary, with IT departments driving adoption in tech-related fields, while operations take precedence in industrial sectors. As AI integration expands, automation and argentic AI are emerging as key developments, accompanied by increasing technical skills and growing regulatory concerns. The generative AI market is projected to reach $66.89 billion by 2025 and grow at a CAGR of 36.99% (2025–2031), reaching $442.07 billion by 2031, with the United States leading in market size.

5.1.2 Key statistics of AI & GenAI—Global and Indian Scenario

The emergence of Artificial Intelligence (AI) is transforming higher education by addressing challenges such as diverse learning needs, large class sizes, and limited personalized support. AI-driven solutions, including machine learning and natural language processing, enable institutions to enhance student achievement by predicting learning difficulties, personalizing educational pathways, and offering continuous assistance. These advancements contribute to improved academic performance, higher graduation rates, and a more engaging learning experience.

AI adoption in education is growing, with over 50% of higher education institutions in the U.S. utilizing AI tools. AI-powered early warning systems have contributed to a 10% decrease in dropout rates, and graduation rates have increased by 4.8% following AI implementation.

Globally, India is emerging as a leader in AI education, with the highest AI skill penetration rate and significant government initiatives, such as the National Education Policy 2020, aimed at integrating AI into curricula. Reports from LinkedIn, Microsoft, and Salesforce highlight India's rapid AI adoption, with 92% of knowledge workers using AI at work compared to the global average of 75%. Despite this progress, concerns over data security, accuracy, and workforce training remain key challenges.

The broader adoption of Generative AI (GenAI) across industries, including education, is reshaping workforce dynamics. The EY India report projects that GenAI could revolutionize 38 million jobs in India by 2030, enhancing productivity across multiple sectors. However, only 3% of Indian firms currently possess in-house AI expertise, emphasizing the need for talent development and industry collaboration.

As AI becomes increasingly integrated into education, its potential to enhance student engagement and learning outcomes continues to be explored. The shift to online learning, accelerated by the COVID-19 pandemic, has made AI-driven education tools more accessible, paving the way for future advancements. The key question remains: Can generative AI truly revolutionize education by fostering engagement and improving learning experiences?

5.1.3 Generative AI in Education

Artificial Intelligence (AI) enables machines and computer systems to emulate human intelligence, facilitating decision-making, learning, and adaptability. A subset of AI, known as Generative AI, can create new content, including text, images, and multimedia, by leveraging trained models.

In the education sector, Generative AI enhances learning by delivering personalized content, generating instructional materials, facilitating assessments, and evaluating student performance. These AI-driven tools have the potential to improve engagement, accessibility, and learning outcomes, marking a significant shift in modern education methodologies.

5.1.4 Advantages of Using Generative AI in Higher Education

Generative AI (GenAI) is revolutionizing higher education by enhancing content creation, assessment design, personalized learning, creativity, collaboration, and administrative efficiency. It enables educators to develop diverse learning materials in multiple formats, automates assessment generation and grading for timely feedback, and acts as a virtual tutor by adapting to individual student needs. Additionally, GenAI fosters creativity through idea generation and supports collaborative learning, while also streamlining administrative tasks, such as scheduling and resource management. However, despite its numerous benefits, GenAI presents challenges related to ethical concerns, data privacy, and the risk of over-reliance on automation, necessitating responsible and balanced integration in academic settings.

5.1.5 Emerging Concerns / Ethical Issues in Using Generative AI in Higher Education

Generative AI presents both opportunities and challenges in higher education, particularly regarding plagiarism, data privacy, student agency, and critical thinking. AI-generated content can inadvertently facilitate academic dishonesty, raising concerns about the integrity of learning assessments. Additionally, the use of AI involves handling vast amounts of data, necessitating strict privacy measures to prevent unauthorized data collection and ensure compliance with regulations. Overreliance on AI tools may diminish students' creativity, critical thinking, and engagement with course material, while also reducing educators' role in shaping learning experiences. Furthermore, biases embedded in AI models can reinforce societal stereotypes, affecting cultural sensitivity in education. Initially, concerns over academic dishonesty led some institutions to ban tools like ChatGPT, while others adopted a more progressive stance, advocating for ethical and transparent AI usage. Recognizing its inevitable advancement, many educators emphasize guiding students in responsibly integrating Generative AI into their learning processes, rather than prohibiting its use.

5.1.6 Regional AI Initiatives in India: Gujarat's Tech Hub and Assam's Educational Revolution

Gujarat and Assam are making significant strides in integrating artificial intelligence (AI) into education and industry, each adopting approaches tailored to their regional needs. Gujarat has partnered with IBM and Microsoft to establish an AI cluster in GIFT City, fostering innovation in financial technology and AI curricula for institutions like Gujarat Technological University (GTU). Meanwhile, Assam's AI Initiative is building a network for students and researchers, focusing on mentorship and industry collaboration to address regional challenges. Additionally, the Shiksha Setu App enhances educational communication and transparency. As both states advance AI adoption, generative AI is reshaping education by enabling personalized learning, automating assessments, and enhancing student engagement through real-time feedback and interactive simulations. While AI-powered teaching systems offer transformative potential, they also present challenges, necessitating further research into their implications for learning and academic integrity.

5.1.7 Statement of problem

To seek answers to the above questions, the proposed study on "Perceptions of Selected University Students from the Northeast and Western regions of India regarding the Application of Generative Artificial Intelligence in Higher Education is thought to be undertaken by the researcher.

5.1.8 Objectives of the study

1) To **prepare a profile** of students from the selected universities of Assam and Gujarat states of India.
2) To assess the **GenAI usage pattern from** the selected university students of Assam and Gujarat states of India.
3) To assess the **knowledge level** regarding the use of Generative AI in higher education among the selected university students of Assam and Gujarat states of India.
4) To assess the overall **perceptions** regarding the use of Generative AI in higher education among the selected university students of the Assam and Gujarat states of India.

5) To assess **aspects-wise perceptions** of the selected university students with

   a) benefits and

   b) concerns related to the use of Generative AI in higher education.

6) To **assess the perceptions** of the selected university regarding the application of Generative AI in higher education for the **following variables**:

   a. Age

   b. Gender

   c. Programme of study

   d. Academic achievement (of previous semester)

   e. Knowledge related to Generative-AI

7) To study **the overall and aspect-wise differences in** the perceptions of all the respondents and the institute-wise selected universities' respondents regarding the applications of Generative AI in higher education for the above-stated variables.

8) To seek the **suggestions** of the selected students regarding the integration of Generative AI in higher education.

5.1.9 Null hypotheses of the study

There will be, overall and aspect-wise, no significant differences in the perceptions of all the respondents and the selected institute-specific university **students** regarding the applications of Generative AI in higher education with their variables.

5.1.10 Assumptions of the Study

1) Selected university students of Assam and Gujarat states possess **knowledge** regarding the application of Generative AI in higher education.

2) Knowledge regarding the application of Generative AI in higher education among selected university students will **vary according to the above selected variables**.

3) The Perceptions regarding the application of Generative AI of selected students **will vary according to selected variables.**

5.1.11 Delimitations of the study

1) The study will be delimited to the selected students of the **College of Community Science for Assam Agricultural University, Assam and the Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat,** only.

2) The present study will be delimited to study the **knowledge, perceptions, benefits, and concerns** related to the application of Generative AI in higher education.

5.2 Methodology

This present study aims to understand the "Perceptions of Selected University Students from the Northeast and Western Region of India regarding the Applications of Generative AI in Higher Education."

5.2.1 Population of the study

Population of this study comprised university students studying CCSc, AAU, Assam and FFCSc, MSU, Gujarat from Northeast region and Western regions of India, under undergraduate (UG), postgraduate (PG) and Ph.D. programme in both the higher educational institutes viz; College of Community Science, AAU, Assam and Faculty of Family and Community Sciences, MSU, Vadodara Gujarat from all the five different specializations under Grant-in-Aid program.

It is to note here that though both selected institutes have applied home science discipline in nature, the nomenclature of the five specializations was observed to be different among both of them, i.e., in the College of Community Science, Assam, five specializations are named as Extension and Communication Management., Family Resource Management, Food Science and Nutrition, Human Development and Family Studies, Textiles and Apparel Designing, whereas in the Faculty of Family and Community Sciences, Gujarat has specializations of Clothing and textiles, Extension and Communication, Family and community resources Management, Foods and Nutrition, Human Development and Family Studies.

5.2.2 Sample of the study

The study sample consisted of the selected higher education students studying in UG, PG, and Ph.D. programmes in each of the departments from the above-stated institutes, viz., AAU of Assam and MSU of Gujarat state.

5.2.3 Construction of the Research Tool

Research tools are crucial for any study and have a significant impact on the quality of data collected. The researcher created a structured English questionnaire based on pilot study results and referring relevant literature, which comprised questions about demographic, information related to usage of GenAI in Higher Education, Knowledge related to application of GenAI in Higher Education, Perceptions on Benefits related to the Application of GenAI in Higher Education, Perceptions on Concern related to the Application of GenAI in Higher Education, Suggestions to integrate the Application of GenAI in Higher Education.

5.2.4 Description of the Research Tool

The researcher designed a questionnaire with five (5) sections to delve into the Perceptions of selected university students from the Northeast and Western regions of India regarding the applications of GenAI in higher education. Each section of the questionnaire is described below.

Table 31: Research Tool Section and Response System

Sections	Parameters	Total No. of items	Tools	Response System
Section A Part 1	Demographic profile of the respondents	9	Multiple-choice and open-ended questions	Select an appropriate option from a provided list and, wherever it is instructed, fill in the blank with the appropriate response.
Section A Part 2	Usages of GenAI tools	7	Multiple-choice questions and open-ended questions	Select an appropriate option from a provided list, and wherever it is instructed, fill in the blank with the appropriate response
Section B	Knowledge Related to Application of GenAI tools	15	Multiple-choice questions	Selecting an appropriate option from a given list that best applies to the respondent. One Correct Answer
Section C	Benefits related to the application of GenAI tools	30	Interval scale	5-point rating scale
Section D	Concern related to the application of GenAI tools	20	Interval scale	5 Point rating scale
Section E	Suggestion to integrate the application of GenAI tools	13	Interval scale	3 Point rating scale

5.2.5 Validity of the research tool

Eight experts validated the research tool, including five teaching faculties from the Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, and three teaching faculties from Assam Agricultural University. Necessary modifications in the research tool were done as per the expert's feedback, which enhanced the tool's effectiveness in terms of relevance, logical order, language use and response system.

5.2.6 Reliability of research tool

The Cronbach's Alpha coefficient test was used to determine the researcher's tool's reliability and ensure internal consistency. The internal reliability test yielded a result of $\alpha = 0.98$, indicating high internal consistency. The test-retest method was used to assess external reliability. The questionnaire demonstrated high internal consistency, with a result of $\alpha = 0.92$, indicating high consistency of the tool.

5.2.7 Pre-testing for the research tool

The questionnaire was pre–tested with twenty students from AAU and MSU in Assam and Gujarat to ensure clarity. The goal was to assess language clarity and determine the time required to complete the form. The tool was made simple and understandable by removing ambiguous items that were found. On average, 13-15 minutes were needed to complete the questionnaire.

5.2.8 Ethical Approval of the Study by the IECHR Committee

To ensure the protection of research respondents and maintain the integrity of the research process, on October 23rd, 2024, the researcher submitted the study to the IECHR Committee for ethical approval. The ethical committee approved it with an ethical approval number by IECHR/FFCSc/M. Sc./10/2024/15.

5.2.9 Procedure for Data Collection

Between 6th November 2024 and 30th December 2024, the research tool, a questionnaire, was distributed to the selected 220 university students via in-person meetings. Out of the total 230 distributed questionnaires, a total of 10 incomplete/ invalid questionnaires were excluded and leaving 220 valid tools for formal data analysis. All the 220 samples were collected through offline mode.

5.2.10 Difficulties encountered during data collection

1. Respondents required constant, repeated reminders.
2. Respondents had trouble understanding the questionnaire, so researcher had to explain it to them.

5.2.11 Tabulation of Data

Data were coded according to response scores and organized in an Excel Spreadsheet.

5.2.12 Scoring and Categorizing data

Various components of the tool were given different weights using various scoring methods.

5.2.12.1 Categorization of Variables of the Study

Table 32: Categorization of Variables of the Study

Sl. No.	Variables	Basis	Categories
1.	Age	<=20	Young
		21-25	Middle
		26-30 and above	Old
2.	Gender	Male	Male
		Female	Female
		Other	Other
3.	Program of the Study	Undergraduate	1st Year
			2nd Year
			3rd Year
			4th Year
		Post-Graduate Diploma/Degree	1st Year
			2nd Year
		Doctorate	1st Year
			2nd Year
			3rd Year
4.	Academic Achievement	50%-65%	Low achievers
		66%-81%	Moderate achievers
		82%-97%	High achievers
5.	Knowledge related to GenAI	Below Mean	Less knowledgeable
		Mean and above mean	knowledgeable

5.2.12.2 Scoring and categorization of usages of GenAI tools

Table 33: Scoring of usages of GenAI tools

No. of items	Minimum score	Maximum score
7	1	84

Categorization of usages of GenAI tools

Table 34: Categorization of Scores in Usage of GenAI tools

	Range	Basis	Categories
Usages of GenAI tools	18-34	Below mean	Low usage
	35-48	Mean and above mean	High usage

5.2.12.3 Scoring and Categorization of students' knowledge of the application of GenAI tools

Table 35: **The possible scores of the knowledge test**

Type of Statements	Minimum score	Maximum score
Multiple-choice questions	0	15
Total	0	15

5.2.12.4 Categorization of scores in students' knowledge of the application of GenAI Tools

Table 36: Categorization of scores in students' knowledge of the application of GenAI tools

Variable	Range	Basis	Categories
Knowledge related to GenAI	3-11	Mean and below mean	Less Knowledgeable
	12-15	Above mean	knowledgeable

5.2.12.5 Categorization of scores in students' overall perceptions regarding the application of GenAI tools

Table 37: Categorization of scores in students' overall perceptions regarding the application of GenAI tools

	Range	Basis	Categories
Overall perceptions	125-148	Mean and below mean	Less Favorable
	149-202	Above mean	Favorable

5.2.12.6 Categorization of scores in students' overall perceptions of benefits regarding the application of GenAI tools

Table 38: Categorization of scores in students' overall perceptions of benefits regarding the application of GenAI tools

	Range	Basis	Categories
Overall perceptions on benefits	76-90	Mean and below mean	Less Favorable
	91-128	Above mean	Favorable

5.2.12.7 Categorization of scores in students' overall perceptions of concern regarding the application of GenAI tools

Table 39: Categorization of scores in students' overall perceptions of concerns regarding the application of GenAI tools

	Range	Basis	Categories
Overall perceptions of concern	43-57	Mean and below mean	Less Favorable
	58-79	Above mean	Favorable

5.2.12.8 Scoring and Categorization of Students' Perceptions of benefits to the application of GenAI tools

Table 40: Scoring pattern according to the nature of the statement regarding students' perceptions of benefits related to the application of GenAI tools

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Positive statements	1	2	3	4	5
Negative statements	5	4	3	2	1

Table 41: Scoring of data for students' perceptions of benefits related to the application of GenAI tools

Total no. of items	Minimum score	Maximum score
30	15	75

5.2.12.9 Scoring and Categorization of students' Perceptions of concerns about the application of GenAI tools

Table 42: Scoring pattern according to the nature of the statement regarding students' perceptions of concerns related to the application of GenAI tools

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Positive statements	1	2	3	4	5
Negative statements	5	4	3	2	1

Table 43: Scoring of data for students' perceptions of concerns related to the application of GenAI tools

Total no. of items	Minimum score	Maximum score
20	20	100

5.2.12.10 Categorization of item-wise Intensity Indices of application of GenAI tools

Table 44: Categorization of intensity indices in students' suggestions regarding the application of GenAI tools

S. No.	Categories	Range of Intensity Indices
1.	Less Extent	2.19-2.37
2.	Some Extent	2.38-2.56
3.	Great Extent	2.57-2.75

5.2.13 Plan for Statistical Analysis of the Data

Table 45: Plan for Statistical Analysis of the Data

Sr. No.	Purpose	Statistical measurement
1)	Demographic profile of the respondents	Percentage
2)	Usages of GenAI by respondents in higher education	Percentage
3)	Knowledge related to the application of GenAI Tools in higher education	Percentage
4)	Overall perceptions of respondents regarding the applications of GenAI Tools in higher education	Percentage
5)	Variable-wise overall perceptions of respondents for the application of GenAI Tools in higher education	Percentage
6)	Differences in the overall perceptions of the respondents regarding the variables	Mann-Whitney U Kruskal Wallis H
7)	Perceptions of respondents regarding benefits of the application of GenAI Tools in higher education	Percentage
8)	Differences in the Perceptions of respondents according to the benefits of the application of GenAI Tools with variables	Mann-Whitney U Kruskal Wallis H
9)	Perceptions of respondents regarding concerns of the application of GenAI Tools in higher education	Percentage
10)	Differences in the Perceptions of respondents according to concerns about the application of GenAI Tools with variables	Mann-Whitney U Kruskal Wallis H
11)	Suggestions to integrate of the selected students regarding the applications of GenAI Tools in higher education	Percentage and Intensity Indices

5.3 Major Findings

5.3.1 Profile of the respondents

- Overall, over half (55.5%) of the respondents belong to the middle age group, i.e., between 21 and 25 years, of this majority (62.7%) were from FFCSc, MSU in Gujarat, and slightly less than half (48.2%) were from CCSc, AAU in Assam.
- Overall, most of the respondents (73.6%) were female, followed by male respondents (24.4%) and institutes-specific results, the high majority (85.5%) of female respondents came from FFCSc, MSU, Gujarat, followed by CCSc, AAU, Assam (61.8%) students.
- Overall, over half (56.4%) of the respondents were in undergraduate programs, of this majority (68.2%) coming from CCSc, AAU, Assam, and less than half (44.5%) coming from MSU, Gujarat.
- Overall near to majority (58.2%) of the respondents fell into the group of low achievers, of this majority (60%) coming from FFCSc, MSU, Gujarat, and over half (56.4%) of the respondents coming from CCSc, AAU, Assam.

5.3.2 Other than Demographic Details of the respondents

- Overall, almost majority (59.1%) of the overall respondents had more GenAI usage, in academic, of this majority (62.7%) coming from CCSc, AAU, Assam, and more than half (55.5%) of them from FFCSc, MSU, Gujarat.
- Overall, almost all (96.8%) of the respondents were aware of the use of GenAI in higher education with almost all (98.2%) the students were from MSU in Gujarat, followed by most of the (95.5%) CCSc, AAU, Assam students.
- Regarding use of GenAI tools in academic work, the vast majority (94.5%) of the respondents used GenAI tools in their academic work with most of the respondents (96.4%,92.7%) were from MSU, Gujarat, and CCSc, AAU, Assam, respectively.
- The GenAI tools used by students in their daily academic activities showed that a large majority (80.7%) of the overall respondents use ChatGPT primarily in their daily academic activities with a vast majority (85.5%) were CCSc, AAU, Assam respondents than FFCSc, MSU, Gujarat respondents (75%) who use GenAI for the same.

- Most of the overall respondents (73.2% and 71.8%, respectively) use GenAI for homework/assignments and idea generation purpose in academics. The usage pattern is similar for identical purposes among FFCSc, MSU, Gujarat students, with a large majority (77.3% and 72.7%), followed by CCSc, AAU, Assam students (69.1% and 70.9%).
- Most of the overall respondents (78.2%) said they had learned GenAI application of tools by themselves with a similar pattern appeared among a greater number of FFCSc, MSU, Gujarat students (79.1%), followed by a high majority (77.3%) of CCSc, AAU, Assam students.
- Overall, nearly all (95.0%) of the respondents had never received any training on utilizing GenAI applications for academic, of these almost all (99.1%) of the students represented CCSc, AAU, Assam, and the vast majority (90.9%) of the students from FFCSc, MSU, Gujarat also used GenAI without any kind of formal trainings.

5.3.3 Knowledge related to the application of GenAI

- The majority (64.1%) of overall respondents fell into the knowledgeable category, among which, with the majority (68.2%, 60%), came from CCSc, AAU, Assam, and from FFCSc, MSU, Gujarat, respectively.

5.3.4 Major Findings of the Study

5.3.4.1 Overall Perceptions of the respondents regarding the applications of GenAI

- Overall, over half of the respondents (54.5%) had favorable perceptions, of these, slightly more respondents (55.5%) were from CCSc, AAU, Assam, than from FFCSc, MSU, Gujarat (53.6%).

5.3.4.2 Aspect wise Perceptions of the respondents related to the application of GenAI

5.3.4.2 a) Perceptions of benefits of the respondents related to the application GenAI tools in higher education

- Mixed trend of respondents' perceptions with more benefit and less benefit regarding the application of GenAI tools in higher education with marginal difference. It revealed that overall 49% of respondents 51.8% from CCSc, AAU, Assam, and 46.4% from FFCSc, MSU, Gujarat had perceived more benefit from the applications of Generative AI (GenAI) in education as against 50.9% observing less benefit 53.6% from perceptions, MSU, Gujarat and 48.2% from CCSc, AAU, Assam for the same.

5.3.4.2 b) Perceptions of concerns of the respondents related to the application of GenAI tools in higher education

- Overall and institute-specific statistics provide a similar picture of the areas of GenAI application in higher education that are more concerning than less. The overall data indicates that just over half (56.4%) of the respondents fell into the category of being more concerned. On the other hand, interestingly, for both university students, i.e., from CCSc, AAU, Assam, and FFCSc, MSU, Gujarat, also showed an equal percentage of this group of being more concerned. The remaining students (43.6%) were less concerned with the use of GenAI in education overall and at the university level.

5.3.4.3 Variable-wise Perceptions of the respondents related to the application of GenAI tools in higher education

Except for the variable program of study, the rest of the variables, viz., age, gender, academic achievement, and knowledge of GenAI, revealed a mixed Perceptions trend parallel for favorable and less favorable.

Age-wise, gender-wise, academic achievement-wise, and knowledge related to GenAI to the mixed perceptions were observed, i.e., both favorable and less favorable data numbers moving in parallel.

Age wise, overall, the data shows that 54% of students in the middle age range of 21–23 years had favorable perceptions of GenAI applications in higher

education, whereas 57% of students in this category had less favorable perceptions. Institute-specific data, revealed the majority of FFCSc, MSU, Gujarat middle-aged students (65%) had less favorable perceptions, followed by less than half (45%) of AAU middle-aged students for the same, while the majority of FFCSc, MSU, Gujarat middle-aged students (61%) had favorable perceptions, followed by less than half (48%) of CCSc, AAU, Assam middle-aged students for the same.

Gender wise, overall, 77% of female students expressed favorable perceptions on the use of GenAI in higher education, compared to 70% who had less favorable perceptions. According to institute-specific data, the majority of FFCSc, MSU, Gujarat female students (84%) and more than half (55%) of CCSc, AAU, Assam female students had less favorable perceptions, while the majority (86%) of FFCSc, MSU, Gujarat female students had favorable perceptions as well, followed by the majority (67%) of CCSc, AAU, Assam female students.

Academic achievement-wise, overall, 56.7% of moderate achievers' students expressed favorable perceptions on the use of GenAI in higher education, compared to 60% of moderate achievers who had less favorable perceptions Institute specific data revealed, the majority of MSU moderate achievers (64.7%) and more than half (55%) of AAU moderate achievers had less favorable perceptions while the majority (55%) of moderate achievers had favorable perceptions as well, followed by more than thirty percent of the (35%) of CCSc, AAU, Assam moderate achievers.

Knowledge related to GenAI overall, the data shows that the majority (60%) of knowledgeable students had favorable perceptions of GenAI applications in higher education, against the majority (67%) of also of them also had less favorable perceptions Institute-specific data revealed that the majority (67%) of CCSc, AAU, Assam knowledgeable students expressed favorable perceptions on the applications of GenAI in higher education, followed by slightly more than half of (53%) FFCSc, MSU, Gujarat knowledgeable students for the same. Strangely, again equal percentage (69%) of knowledgeable students of CCSc, AAU, Assam, and FFCSc, MSU, Gujarat middle-aged students (61%) had less favorable perceptions for the same.

According to the variable programme of study, overall data revealed that, majority (63%) of undergraduate students had favorable perceptions on GenAI applications in higher education, based on the respondents' study program. Based on data particular to the institution, opposite trend was observed where high majority (75%) of CCSc, AAU, Assam undergraduate students had a favorable perception about the use of GenAI in higher education, whereas slightly less than half (49%) of FFCSc, MSU, Gujarat postgraduate students had unfavorable perceptions for the same.

5.3.4.3 Overall and aspect-wise significant differences in the perceptions of the all the respondents and institute wise respondents with reference to the variables related to the application of GenAI tools in higher education

- The study found no significant differences in the overall perceptions of all respondents, regardless of age, gender, knowledge of GenAI, or program of study irrespective of both the educational institutes viz., CCSc of AAU, Assam and FFCSc, MSU, Vadodara.
- The study also found no significant differences in the perceptions of all respondents, related to benefits of application of GenAI in higher education regardless of age, gender, knowledge of GenAI, or program of study irrespective of both the educational institutes viz., CCSc of AAU, Assam and FFCSc, MSU, Vadodara.
- The study also found no significant differences in the perceptions of all respondents, related to concerns of application of GenAI in higher education regardless of age, gender, knowledge of GenAI, or program of study irrespective of both the educational institutes viz., CCSc of AAU, Assam and FFCSc, MSU, Vadodara.

5.3.4.4 Suggestions to Integrate the Applications of GenAI

High majority of the respondents recommended that universities should provide clear ethical policies on data handling when using AI tools in education (overall 76.4%, and institute-wise 81.8% AAU and 70.9% MSU). A similar table observed its intensity indices overall mean score, which was 2.7, i.e., to a great extent and also institute-wise mean scores were 2.8 and 2.7 accordingly. It indicates that the selected respondents of the current study highly suggested the

statement. Thus, it can be inferred from this finding that, in the technology era it is being seen the applications of Generative Artificial Intelligence in education, but students are concerned about the ethical policies which is reported and strongly reported by a high majority of the respondents with great intensity. This finding implies that respondents feel that it would be safer when using the GenAI applications in academics for more safe side of data handling. Therefore, university should provide ethical policies on data handling.

5.4 Conclusion

In conclusion, the findings of the research study provide valuable insights into the perceptions of university students regarding the application of GenAI tools in higher education. It can be inferred from the research study's findings regarding the university students' perceptions of CCSc, AAU, Assam, and FFCSc, MSU, Gujarat regarding the application of GenAI tools that the students' community has a favorable Perceptions toward the applications of GenAI tools.

Though there is no significant difference in the overall perceptions, perceptions on benefits and perceptions on concerns of university students regarding the application of GenAI tools were noted, nevertheless, underscoring the significance of considering individual Perceptions and knowledge in the application of GenAI tools in academics are worth considering.

Overall, the study emphasizes the necessity of focused interventions meant to improve university students' knowledge, perceptions of the value and usability of the application of GenAI tools in academics. Technology integration can be more successful by implementing strategic ways to ensure and enhance artificial intelligence literacy, offer assistance and training, add ethical guidelines, and remove institutional barriers.

5.5 Recommendations for further studies

- A comparative study using the teaching staff /faculty of the universities' multidisciplinary higher education institutes can be conducted.
- A comparative study of ChatGPT and other GenAI tools adoption among multidisciplinary higher education staff and students.

- A comparative study of generative AI tools' influence on higher education and usage patterns can be conducted.
- A study on the use of GenAI tools among school children can be conducted.
- Training needs assessment interventions regarding application of GenAI tools for university students, teachers and multi- stakeholders can be conducted.

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ANNEXURE – 1A

PERMISSION LETTER

No. 1042
DEI - 30/10/24

Department of Extension and Communication
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda
University Road, Vadodara-390002, INDIA
Ph: (+91-0265)2795522 Email: extensioncommunication@yahoo.co.in

To
The Dean
College of Community Science,
Assam Agricultural University,
Jorhat, Assam.

Date: 21st Oct, 2024

Subject: Seeking Permission to collect data from students of College of Community Science, Assam Agricultural University, Jorhat, Assam

Respected Madam,

With reference to above subject, this is to make you aware that, Ms. Jigyasha Deka, is a postgraduate student from the Department of Extension and Communication, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India. She as a part of partial fulfillment of her M.Sc. dissertation, carrying out research on "Perceptions of Selected University Students from the Northeast and Western Regions of India Regarding the Application of Generative AI in Higher Education". The study aims to understand home-science students' perceptions regarding benefits and concerns of application of Generative AI tools in higher education. In this context, Undergraduate, Postgraduate and PhD students from different departments of College of Community Science, Assam Agricultural University, Jorhat, Assam will be approached by the her as an investigator.

So, humble request to grant permission to the investigator to approach current batch of College of Community Science, AAU students for data collection. The participation of the students will be voluntary based on their consent, will take approximately 15-20 min. as per attached research tool. This is to assure you that information provided by the students will be kept confidential and used for academic purpose only.

Request you to kindly grant permission for the same.

If you require any further information, you can contact us at:
Name of Investigator(MSc student): Deka Jigyasha, E-mail: jigyashadeka1999@gmail.com
Phone Number: 6001524124
Name of Research Guide: Dr. Varsha Parikh, Associate Professor
E-mail: varshaparikh-extcomm@msubaroda.ac.in, Phone Number: 9586880276

Thank you,

Varsha Parikh

Dr.Varsha Parikh (Research Guide)

Through,

Dhaval

for **(Dr.Avani Maniar)**

Head of the Dept

DEAN
Faculty of Community Science
A.A.U. Jorhat-13
30/10/24

ANNEXURE – 1B

PERMISSION LETTER

Department of Extension and Communication
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda
University Road, Vadodara-390002, INDIA
Ph: (+91-0265)2795522 Email: extensioncommunication@yahoo.co.in

To,
The Dean
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda
Vadodara, Gujarat, India

Date: 21st Oct, 2024

Subject: Seeking Permission to collect data from students of faculty of Family and Community Sciences, The M.S.University of Baroda, Vadodara, Gujarat, India

Respected Madam,

With reference to above subject, this is to make you aware that, Ms. Jigyasha Deka, is a postgraduate student from the Department of Extension and Communication, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India. She, as a part of partial fulfillment of M.Sc. dissertation, carrying out her research on "Perceptions of Selected University Students from the Northeast and Western Regions of India Regarding the Application of Generative AI in Higher Education". The study aims to understand home-science students' perceptions regarding benefits and concerns of application of Generative AI tools in higher education. In this context, Undergraduate, Postgraduate and PhD students of different departments of faculty of Family and Community Sciences, The M.S.University of Baroda, Vadodara, Gujarat will be approached by her as an investigator.

Sp. humble request to grant permission to the investigator to approach FFCSc, MSU students for data collection. The participation of the students will be voluntary with their consent only, will take approximately 15-20 min.as per attached research tool. This is to assure you that information provided by the students will be kept confidential and used for academic purpose only.

Request you to kindly grant permission for the same.

If you require any further information, you can contact us at:
Name of Investigator(MSc student): Deka Jigyasha, E-mail: jigyashadeka1999@gmail.com
Phone Number: 6001524124
Name of Research Guide: Dr. Varsha Parikh, E-mail: varshaparikh-extcomm@msubaroda.ac.in,
Phone Number: 9586880276

Thank you,

Dr.Varsha Parikh (Research Guide)

Through,

For **(Dr.Avani Maniar)**
Head of the Dept

Permitted

I/c DEAN
Faculty of Family And Community Sciences
VADODARA

ANNEXURE – 2

TOOL VALIDATION LETTER

Department of Extension and Communication
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda, Vadodara

To, **Date:**

Subject: - Request letter for Tool Validation

Respected Sir/Madam,
I, Ms. Jigyasha Deka, a Master's student in the Department of Extension and Communication, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, is working on a research study entitled, **"Perceptions of Selected University Students from the Northeast and Western regions of India regarding the Application of Generative Artificial Intelligence in Higher Education".**

In this regard, I have prepared a questionnaire to assess the perception level of selected university students from the Northeast and Western regions of India regarding the Application of Generative Artificial Intelligence in Higher Education. The attached questionnaire contains questions regarding the application of Generative AI in higher education. Being a senior academician, you are selected as one of the experts to validate the tool. I request you to validate the attached research tool in terms of its content validity, and response system to make my study valuable.

I wish to convey my thanks in anticipation for contributing your valuable suggestions and your valuable time to help me to make an authentic tool.

Thanking You,

Your Faithfully,

Jigyasha Deka
Sr.M.Sc. E.C. Student
Batch 2023-25

Dr.Varsha Parikh
Research Guide
Associate Professor
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda , Vadodara

ANNEXURE – 3
CONSENT LETTER

Department of Extension and Communication

Faculty of Family and Community Sciences

The Maharaja Sayajirao University of Baroda, Vadodara

STATEMENT OF INFORMED CONSENT FROM RESPONDENT

Dear Respondent,

My name is Deka Jigyasha and I am a Senior Master's student at the Department of Extension and Communication, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara. As a part of my study of partial fulfilments of my dissertation, I am carrying out research on the **"Perceptions of Selected University Students from the Northeast and Western regions of India regarding the Application of Generative Artificial Intelligence in Higher Education"**. The study aims to assess the overall perceptions of selected university students from the Northeast and Western regions of India regarding the Application of Generative Artificial Intelligence in Higher Education.

The Department of Extension and Communication supports the practice of protection of human participants in research. The following will provide you with information about the research that will help you in deciding whether or not you wish to participate. Participation in this study is voluntary and it is entirely up to you to answer or not answer any question or the questionnaire. You have been selected by chance as a respondent for this tool and can give consent by signing below to fill out the tool. There is no risk/harm as well as benefit in understanding what is your perception regarding the Application of Generative Artificial Intelligence in Higher Education. This study is purely linked only for educational purposes. I respect your privacy and in no circumstances, your identity will be revealed directly or indirectly at any stage of the research and the information you provide will be kept strictly confidential. I request and hope that you take part in responding to this research questionnaire, it will take only 10-15 minutes of your valuable time. If you have any further questions concerning this study, please feel free to contact us by phone or email: Deka Jigyasha at [6001524124 / jigyashadeka1999@gmail.com]. **Your participation is important and is highly appreciated.**

Thanking You **Dr. Varsha Parikh**

Jigyasha Deka **Research Guide**

Research Scholar **Signature of the Participants……..**

ANNEXURE – 4

RESEARCH TOOL

Form No.

Section A

Part 1 - Demographic Information

Instructions: The following section has items related to your background information. Please read them carefully and put a tick (✅) against the most appropriate option and furnish details wherever asked.

1. **Name (Optional) _____**
2. **Age (in years) _____**
3. **Gender:** **Code**

☐ a) Male
☐ b) Female 1
☐ c) Prefer not to say 2
☐ d) Others (Please specify) _____ 3
4

4. **a) Name of the Department _____**

   b) Name of the University _____

5. **Programme of Study:**

☐ a) Undergraduate Degree 1
☐ b) Post Graduate Diploma 2
☐ c) Post Graduate Degree 3
☐ d) Doctorate Degree 4

6. **Currently studying in:**

☐ a) 1st Year 1
☐ b) 2nd Year 2
☐ c) 3rd Year 3
☐ d) 4th Year 4

7. **Academic achievement of last semester (in %) _____**
8. **How often do you use the following digital devices, do you use in your daily life?**

Sr.no.	Digital devices	Mostly (3)	Sometimes (2)	Rarely(1)
a)	Smartphone			
b)	Laptop			
c)	Desktop			
d)	Others (please specify)			

9. **Accessibility of internet connectivity:**

   Unlimited(2) …….. / Limited(1)……

Section A
Part 2 - Information related to usage of Gen AI in Higher Education

Instructions: The following section has items related to your background information. Please read them carefully and put a tick (✅) against the most appropriate option and furnish details wherever asked.

		Code	Scores
1	**Are you familiar with Generative Artificial Intelligence (AI) tools?**		
	☐ a) Yes	1	1
	☐ b) No	2	0
2	**Have you used any Generative AI tools in your academic work?**		
	☐ a) Yes	1	1
	☐ b) No	2	0

3 **State at least five names of the different GenAI tools you are aware of and have used in your daily academic activities and also mark how frequently it is used for academic study.**

S.No.	Name of the Gen AI tools	Mostly (3)	Sometimes (2)	Rarely (1)	Code	Scores
a)					1	3
b)					2	3
c)					3	3
d)					4	3
e)					5	3

Purpose of Using GenAI -

4 Direction: The statements below pertain to the purposes of using various Gen AI tools in study-related tasks. Kindly respond with your level of engagement for each of the following statements regarding your use of Gen AI tools on a scale of 1 to 3 (1= to a low extent, 2= to some extent, 3= to a great extent) by marking the appropriate box with a check (☑)

S.No.	Purposes of using the Gen AI tools	Mostly (3)	Sometimes (2)	Rarely (1)	Code	Scores
a)	Generating idea				1	3
b)	Doing homework/assignments/ project work				2	3
c)	Content creation/proposal drafting				3	3
d)	Image creation				4	3
e)	Searching for new information				5	3
f)	Explanation of information/material				6	3
g)	Problem-solving				7	3
h)	Writing seminar/conference papers				8	3
i)	Designing PPT for presentation				9	3
j)	Designing websites				10	3
k)	Audio generation				11	3
l)	Video making				12	3
m)	Any others (pl Specify)				13	3

5 **Since when you have started using different Gen AI applications for Academic activities?**

☐	a) <=3 months	1	1
☐	b) >3 months	2	2
☐	c) <= One year	3	3
☐	d) > One year	4	4

6 **What are your sources of information for learning about new Generative AI applications?**

S.No.	Sources of using the Gen AI tools	Mostly (3)	Sometimes (2)	Rarely (1)		
a)	By own self (trial and error)				1	3
b)	Friends and Peers				2	3
c)	Online tutorials and videos				3	3
d)	Social Media				4	3
e)	Workshop / Seminars				5	3
f)	Online courses				6	3
g)	University courses				7	3
h)	Others (please specify)				8	3

7 **Have you undergone any training on Gen AI tools?**

☐	a) Yes	1	1
☐	b) No	2	0

Minimum Score-1, Maximum Score-84, Range – 1-84

Section B

Knowledge related to application of Generative Artificial Intelligence in Higher Education

Direction: Following are the statements related to knowledge about usage of Gen AI tools. Please respond by selecting given options for each statement to indicate your familiarity with them by marking the appropriate box with a check (√).

S.No.	Questions	Code	Score
1	**According to you, what does "Generative AI" primarily refer to?**		
	☐ a) AI that only analyzes data	1	0
	☐ b) AI that generates new content from existing data	2	1
	☐ c) AI used for hardware improvements	3	0
	☐ d) AI used exclusively in robotics	4	0
2	**Which of the following is an example of a generative AI tool?**		
	☐ a) Gemini	1	1
	☐ b) Microsoft Excel	2	0
	☐ c) Python	3	0
	☐ d) SQL	4	0
3	**Generative AI can be used to create which of the following types of content?**		
	☐ a) Text	1	0
	☐ b) Images	2	0
	☐ c) Music	3	0
	☐ d) All of the above	4	1
4	**What is the primary function of a generative AI in an academic context?**		
	☐ a) To automate administrative tasks	1	0
	☐ b) To create new content, ideas, or solutions	2	1
	☐ c) To monitor student attendance	3	0
	☐ d) To manage campus security	4	0
5	**Which of the following factors most influences students' acceptance of generative AI in education?**		
	☐ a) fun of using the technology	1	0
	☐ b) User-friendliness of the GenAI tools	2	1
	☐ c) Geographical location	3	0
	☐ d) Age of the students	4	0
6	**Which of the following is a key ethical concern related to generative AI in academics?**		
	☐ a) AI's inability to process large data sets	1	0

	☐	b) AI's potential to generate biased or misleading content	2	1
	☐	c) AI's high operational cost	3	0
	☐	d) AI's slow processing speed	4	0
7		**In the context of generative AI, what does "GPT"** stand **for?**		
	☐	a) General Processing Tool	1	0
	☐	b) Generative Pre-trained Transformer	2	1
	☐	c) Global Predictive Technology	3	0
	☐	d) Generalized Predictive Transformer	4	0
8		**What is the potential benefit of using generative AI in generating course content?**		
	☐	a) It replaces the need for instructors altogether	1	0
	☐	b) It allows for rapid creation of diverse and customizable learning materials	2	1
	☐	c) It guarantees higher student engagement without additional effort	3	0
	☐	d) It requires no oversight from educators	4	0
9		**Which of the following is a limitation of generative AI in education?**		
	☐	a) It can only be used for simple tasks	1	0
	☐	b) It requires large amounts of data to function effectively	2	1
	☐	c) It is completely autonomous with no need for human input	3	0
	☐	d) It is immune to biases in data	4	0
10		**In what way could generative AI pose a challenge to academic integrity?**		
	☐	a) By making it easier to detect plagiarism	1	0
	☐	b) By enabling students to generate work that isn't entirely their own	2	1
	☐	c) By encouraging critical thinking	3	0
	☐	d) By making academic dishonesty impossible	4	0
11		**What is one way generative AI can assist in research activities?**		
	☐	a) By conducting experiments independently	1	0
	☐	b) By generating research hypotheses and analyzing data patterns	2	1
	☐	c) By replacing the need for literature reviews	3	0
	☐	d) By making manual data collection obsolete	4	0
12		**Why is data privacy a concern when using generative AI in education?**		
	☐	a) AI tools often collect and store large amounts of personal data	1	1
	☐	b) AI does not require any data to function	2	0
	☐	c) AI tools are completely transparent in their data usage	3	0
	☐	d) Data privacy is not a concern with generative AI	4	0

13	**What type of content can a text-based generative AI like GPT-4 create?**			
	☐	a) Legal documents	1	0
	☐	b) Creative writing pieces	2	0
	☐	c) Academic essays	3	0
	☐	d) All of the above	4	1
14	**What is a potential ethical issue with using generative AI to create student assignments?**			
	☐	a) It can make the assignments more challenging	1	0
	☐	b) It can result in unintentional plagiarism	2	1
	☐	c) It guarantees higher grades	3	0
	☐	d) It eliminates the need for original thought	4	0
15	**Generative AI's ability to generate images can be particularly useful in which educational field?**			
	☐	a) Pure science disciplines	1	0
	☐	b) Applied disciplines	2	0
	☐	c) Home Science	3	0
	☐	d) All of the above	4	1

Minimum Score-0, Maximum Score-15, Range -0-15

Section C

Perceptions on Benefits related to the Application of Gen AI in Higher Education

Direction: The following are the statements related to the perceptions of selected states' University Students about benefits related to the Applications of Generative AI tools in higher education for study. Please respond by selecting your appropriate response on a scale of 1 to 5, where 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Neutral (N), 4=Agree (A), 5=Strongly Agree (SA) Strongly Disagree " for each statement and indicate it with a check (✔) in the appropriate column.

S.No.	+ve/-ve	statements	SD 1	D 2	N 3	A 4	SA 5
1	N	Relying on Gen AI tools distracts students from their important academic responsibilities.					
2	P	Students find Gen AI applications to be a helpful way to relax during stressful study periods.					
3	P	Gen AI tools help students to connect with peers who share similar academic interests.					
4	N	Relying on Gen AI for drafting messages make students' communication with professors professional.					
5	P	Generative AI provides equal access to all learners at any time, helping to reduce biases in the education system.					
6	N	Gen AI usage distract students from the hard work needed to truly become an expert in their field.					
7	P	Gen AI tools provides valuable insights into students' academic performance, helping them identify areas for improvement.					
8	N	Depending on GenAI tools for tracking deadlines lead individual student to neglect time management skills.					
9	P	Most Gen AI applications are user-friendly for individual student to navigate, even for someone who's not tech-savvy.					
10	N	Encountering bugs and glitches, frustrates students in using the GenAI tools.					
11	P	Use of Gen AI reduce the need of human instructors in the educational process.					
12	N	Relying on the simplicity of using Gen AI for research lead students to miss out on deeper learning experiences offered by traditional methods.					
13	P	Using GenAI in study significantly improves the quality of assignments and projects submitted by the students of higher education.					
14	N	Gen AI applications do not help in improve understanding of the study materials.					
15	P	Gen AI tools help to complete assignments faster and allowing to focus on other important tasks.					
16	N	Most of the features of Gen AI tools are not useful for all the academic courses.					
17	P	Generative AI tools helps find relevant academic information more efficiently than traditional methods.					

S.No.	+ve/-ve	statements	SD 1	D 2	N 3	A 4	SA 5
18	N	Using Generative AI tools to seek academic information is less efficient compared to traditional methods.					
19	P	GenAI tools allows students to save time when searching for information related to studies.					
20	N	Using GenAI tools could compromise academic integrity by encouraging plagiarism.					
21	P	GenAI applications increase the sense of academic competence among students.					
22	N	Using GenAI tools makes the students' learning experience less satisfying.					
23	P	Gen AI tools enhance collaboration among students, leading to more meaningful peer-to-peer interactions.					
24	N	Over-reliance on Gen AI tools reduce independent study efforts of the students.					
25	P	Incorporating GenAI tools into study routine makes learning more engaging and interactive for students.					
26	N	Students' getting addicted to use GenAIs leaves gaps in essential skills needed in the workforce.					
27	N	Reliance on GenAI promotes lack of confidence among students for their self efforts.					
28	P	Using GenAI prepares students better for the demands of the modern workforce.					
29	P	Use of Gen AI applications excite students about future educational technology innovations.					
30	N	Over-reliance on GenAI tools limits cognitive skills (like analysing, synthesising etc) skills amongst students.					

Positive statements- 15, Negative statements -15

Minimum score -15, Maximum score-75, Range -15-75

Section D

Perceptions on Concerns related to the Application of Gen AI in Higher Education

Direction: The following are the statements related to the perceptions of selected state University Students about concerns in terms of expected challenges related to the Applications of Generative AI tools in higher education for study. Please respond by selecting your appropriate response on a scale of 1 to 5, where 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Neutral (N), 4=Agree (A), 5=Strongly Agree (SA) Strongly Disagree " for each statement and indicate it with a check (✔) in the appropriate column.

+ve/-ve	S. No.	Statement	SD 1	D 2	N 3	A 4	SA 5
N	1	Gen AI threatens human creativity by encouraging students to rely on automated content creation.					
N	2	Use of GenAI applications lures students away from focused work.					
P	3	Gen AI tools are reliable and produce academically credible and trustworthy content.					
N	4	Use of Gen AI help students to bypass learning, leading to a decline in their critical thinking and problem-solving skills.					
N	5	The potential for misinformation generated by GenAI is a serious issue.					
N	6	While Gen AI support students' creative processes and help generate ideas, using it to produce work represented as entirely original raises significant ethical concerns in academic settings.					
N	7	GenAI is used to generate harmful contentment for malicious purposes.					
N	8	Use of Gen AI in academic tasks diminish students' ability to develop original, creative ideas.					
P	9	GenAI tools substitute students' efforts to engage in ethical research practices by offering suggestions for authentic academic work.					
N	10	The risk of plagiarism increases with the use of GenAI tools among students.					
N	11	AI-generated content contain factual errors, which could negatively impact academic work.					
N	12	GenAI tools raise concerns about data privacy, as students' personal and academic data may be exposed.					
N	13	The use of GenAI raises questions about intellectual property rights in academia.					
N	14	Generative AI tools unintentionally produce biased content based on the data they are trained on.					
N	15	Students' private data used inappropriately by AI tools without their consent.					
P	16	GenAI could potentially lead students to misuse generative AI tools for dishonest purposes in academia.					
P	17	Generative AI makes it easier for students to engage in plagiarism and academic dishonesty.					
P	18	GenAI could potentially reinforce equality in academic performance among students from different backgrounds.					

P	19	The potential of Gen AI will reduce student teacher ratio demand.					
P	20	GenAI systems ensure accountability by allowing users to verify the content's accuracy and source.					

Minimum score -20, Maximum score – 100, Range – 20-100

Positive statements – 7, negative statements -13

Section E

Suggestions to integrate the Application of Gen AI in Higher Education

Direction: The following are the statements related to the suggestions to integrate the application of Gen AI in Higher Education. Kindly indicate your response it with a check (✓) in the appropriate column.

S.No.	Suggestions	GE 3	SE 2	LE 1
1	There should be clear ethical policies on data handling when using AI tools in education.			
2	Gen AI creators should have control over how their work is used by AI systems.			
3	Educational institutions should provide guidelines for the ethical use of GenAI tools by students and faculty alike.			
4	Universities should organize awareness programs to educate students about the risks associated with generative AI usage.			
5	Regular trainings, workshops or seminars on responsible AI usage should be mandatory for all students entering in higher education programs.			
6	Regular conferences/ seminars or interactions/discussion forums around generative AI applications should be organized to understand diverse perspectives from various stakeholders. (including students, educators, and policymakers).			
7	Open resources should be made available to help understand the ethical concerns related to generative AI usage.			
8	Responsible integration of generative AI should be taught higher education institutes for innovative educational practices while addressing potential risks effectively.			
9	Students should develop AI literacy skills to critically evaluate AI-generated content and understand its limitations.			
10	Higher educations should redesign curricula and assessments to incorporate AI tools while maintaining academic integrity.			
11	Comprehensive AI ethical programs should be established by higher institutions for responsible AI use across the institution.			
12	Guidelines should be designed by policy makers for equitable access to AI tools and resources across different institutions and student populations.			
13	Any other (pl specify)……..			

Minimum score -13, Maximum score – 39, Range – 13-39

ANNEXURE – 5

ETHICAL COMMITTEE APPROVAL CERTIFICATE

सत्यं शिवं सुन्दरम्
Estd. 1949

Institutional Ethics
Committee for Human
Research
(IECHR)

FACULTY OF FAMILY AND COMMUNITY SCIENCES
THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

Ethical Compliance Certificate 2024-2025

This is to certify Ms. Deka Jigyasha study titled; "Perceptions of Selected University Students from the Northeast and Western Regions of India Regarding the Application of Generative AI in Higher Education." from Department of Extension and Communication has been approved by the Institutional Ethics Committee for Human Research (IECHR), Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda. The study has been allotted the ethical approval number IECHR/FCSc/M.Sc./10/2024/15.

Komal

Prof. Komal Chauhan
Member Secretary
IECHR

Prof. Mini Sheth
Chairperson
IECHR

Chair Person
IECHR
Faculty of Family & Community Sciences
The Maharaja Sayajirao University of Baroda

ANNEXURE –6

PLAGIARISM REPORT

DrillBit

The Report is Generated by DrillBit Plagiarism Detection Software

Submission Information

Author Name	Jigyasa Deka
Title	Perceptions Of Selected University Students From The Northeast And Western Regions Of India Regarding The Applications of Generative Artificial Intelligence In Higher Education
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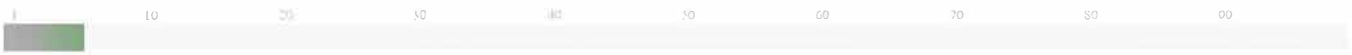
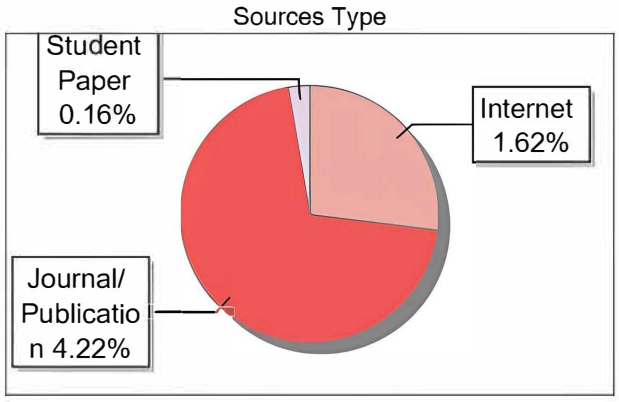
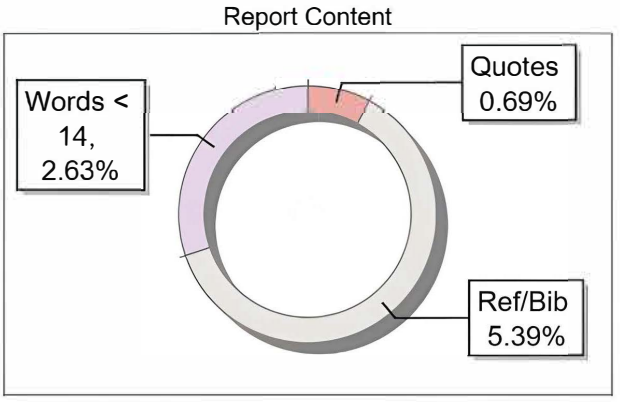
Result Information

Similarity **6 %**







Exclude Information

Quotes	Excluded
References/Bibliography	Excluded
Source: Excluded < 14 Words	Excluded
Excluded Source	**0 %**
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Database Selection

Language	English
Student Papers	Yes
Journals & publishers	Yes
Internet or Web	Yes
Institution Repository	Yes

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