From Assistance to Autonomy: Examining How Large Language Models Influence Learning and Development Among Students

Shriya Barkol[*1], Jayashree Balasubramaniam[2], Suman Madan[3], Malcolm Homavazir[4], Aayyat Khanna[5]

[1,2,3,4,5]Atlas Skilltech University, Mumbai, India
*Corresponding Author Email: shriya.barkol.phd2029@atlasskilltech.university

Abstract

The advent of large language models (LLMs) such as ChatGPT and Google's Gemini has profoundly reshaped student learning, engagement, and academic practices in the university sector. This research explores students' deployment of LLMs, their conceptualisations of such tools, efficacy, advantages, and virtues, as well as global learning and development of 108 undergraduate and postgraduate students from an urban state private university in India.

A mixed-method survey approach was used to collect quantitative data along with qualitative insights into students' experiences and interactions with LLMs. The results reveal that students, in general, perceive LLMs as useful "study partners" which facilitate their understanding of complex, multifaceted issues, help in brainstorming, and improve their assignments' quality.

However, the majority of them felt that they were overdependent and that their LLM was their go-to thing for everything. They also reiterated that their thinking hats were resting and no attempts were made to sharpen them. The research revealed that good students usually use LLMs to gain more conceptual understanding, while other students may sometimes use them to get quick answers thus they are prevented from independent thinking. In addition to that, some people declared that the ability to create good prompts became a necessary skill in order to get the most out of these tools.

The findings, in general, highlight the necessity of clear institutional policies, ethical codes and that digital literacy training ensures that LLMs are a supporting tool in the students' learning journey and their intellectual growth.

Keywords: Large Language Model, AI, pedagogy, student engagement

1 Introduction

The rapid growth of AI in the last few years has resulted in significant changes to various industries, including the field of education. The use of AI tools, especially large language models like ChatGPT, in education is a turning point for this industry. These technologies can amazingly understand, process, comprehend and generate human-like texts from both structured and unstructured data, thus, they have the huge potential to change the whole education system. The launch of ChatGPT has been followed by an unprecedented wave of

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interest in the use of AI in education, as can be seen from figure 1 showing the searches for education and ChatGPT).

Before the public release of ChatGPT on November 30, 2022, LLMs were considered "useful but limited". After that day, they were perceived as "being everywhere and doing everything". This change in the global perception of LLMs can be interpreted as the main reason for the huge increase in the number of searches related to ChatGPT in education (Fig.1).

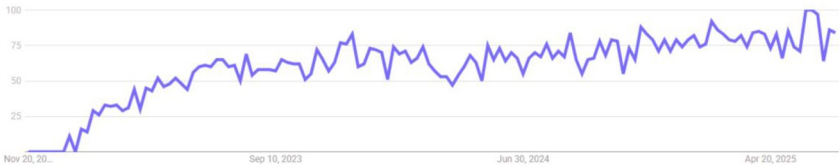

Fig 1: Keyword - ChatGPT in education

Interest in ChatGPT over time (Source: Google Trends - July 2025)

The technological evolution of this type creates a higher education environment that has many opportunities but also significant challenges. The conventional educational systems are often unable to properly address the varied learning needs of students, and they also suffer from resource misallocations, for example, teachers may spend a lot of time on repetitive grading and hardly any time on student development. LLMs can be helpful in such a situation as they provide assistance to students in making content, resolving doubts, researching, and learning process personalization, self-learning promotion, and independent-learning-conducive environment creation. As a matter of fact, LLMs may become a tool through which access to knowledge is democratized, the research process is accelerated, and personalized learning pathways are facilitated as it is stated by Mohamed Diab Idris et al. (2024).

Nevertheless, the idea of using large language models to transform the world is accompanied with a lot of concerns. One of the major worries is academic integrity, a concern that is backed by research results indicating that LLMs such as ChatGPT can produce advanced texts that are hard to tell apart from human ones hence, online examination integrity is the most affected area (Susnjak, 2022). This kind of ability requires a thorough analysis into the usage and impact of LLMs. This paper focuses on the present LLMs engagement, habit patterns and perceived efficiency and subsequent effects on the learning and development of students of an urban institution undergraduate and postgraduate programs. By gauging students' views, the LLM integration study intends to uncover first-hand benefits in learning through LLMs, challenges faced, and the impact of LLMs interaction on critical thinking and independent learning skills.

2 Literature Review

One of the major effects that the use of Artificial Intelligence (AI) in education has produced is a widespread inquiry regarding the functions and influences of large language models (LLMs). From a scientific point of view and also by including cooperative technologies (Qian et al., 2024), there seems to be a lot of room for new concepts to open up nearly limitless sources of information (Li et al., 2024a; Aher et al., 2023). LLMs have been substantially utilized in various domains like social and psychological research (Aher et al., 2023; Park et al., 2023; Li et al., 2024a; Gao et al., 2023; Li et al., 2024d; Zhang et al., 2024), software development (Qian et al., 2024; Hong et al., 2023), chemistry and medicine (Li et al., 2024c; M. Bran et al., 2024), and even in games (Wang et al., 2023). Meanwhile, studies keep discovering new ways to improve the models' performance in different ways.

2.1 LLMs Applications and Benefits

In educational settings, large language models (LLMs) are often utilized as systems that support learners in recognizing their errors and concentrating on the key learning goals (Perkins, 2023). Wang et al. (2024) survey a wide range of studies and present that LLMs can correct errors, solve problems, and even act as a "confusion helper" for students who are perplexed. Besides that, these models encourage educators by generating questions, facilitating automatic grading, and creating content. In addition, LLMs enhance the adaptability of learning through knowledge tracing and personalized content creation, and many commercial LLM- based education tools are emerging in the market (Wang et al., 2024).

(Gan, W et al. 2023) additionally investigate LLMs in intelligent education, with a focus on the aspects of personalised learning, the role of an intelligent tutor, and the assessment function essential for student data analysis, provision of prompt feedback, and evaluation of results. In the same vein, (Celik, I. et al. 2022) argue that AI is a great help to teachers for the planning (gathering student background information), execution (monitoring learning, reducing workload), and assessment (automated essay scoring, instructional feedback) phases. An in-depth study by Mohamed Diab Idris et al. (2024) is about the different ways LLMs can revolutionize higher education, e.g., by making it open to all, speeding the research process, supporting user-tailored learning paths, automating the handling of administrative tasks, and encouraging cross-disciplinary cooperation.

Joshi, I. et.al (2018), in their research on undergraduate engineering education in Indian universities, reported that students who used LLMs such as ChatGPT were able to simplify their tasks, condense vast information, maintain uninterrupted workflow for external resources, and at the same time, save both time and effort. The students also turned to ChatGPT in order to get the help they needed in creating content such as slide decks and presentations. Teachers, on the other hand, thought of ChatGPT as a means of delivering concise information, complementing classroom teaching, and providing an easy going experience.

2.2 Challenges and Concerns with LLMs in Education

Large language models (LLMs), e.g., ChatGPT, when applied and integrated into education systems, have widespread benefits, but at the same time, they bring significant challenges and concerns. One of the main issues is the problem of academic integrity. Perkins, M. (2023), argues that LLMs are able to produce brand-new,argued, and logically structured works that are hard to disclose. In a similar way, Susnjak, T. (2022), pointed out that ChatGPT can perform

complex intellectual tasks and produce realistic, coherent, logically structured works which are often indistinguishable from human ones, thereby, it is an unprecedented situational threat to the integrity of online exams and the traditional method of plagiarism detecting by which it is rendered ineffective. It is also pointed out that students are penalized by their teachers based on errors found by online systems for detecting plagiarism in the student's works, and thus, conflicts are arising (Klee, 2023). Other researchers came to the same conclusions that texts created by LLMs are hard for humans to recognize (Clark et al., 2021; Gunsertal., 2021; Köbis and Mossink, 2021; Abd-Elaal et al., 2022) and hence some universities have turned off the identification functionalities because of false positives and concerns (Coley, 2023). There is similarly an increasing concern that students are getting used to LLMs as a means of completing their writing assignments with one in three students reportedly using ChatGPT (Intelligent,2023). Some universities have banned the use of LLMs, while others have allowed its use with certain restrictions; however, most institutions are still in a 'wait and see' mode, thus not setting out clear guidelines as to the cost-benefit evaluation is still unclear (Sullivan et al., 2023). LLMs may "fantasize the actuals" (Ye et al., 2023), and there has been a documented latent risk of bias for AI-generated content (Yan, L. et al., 2023; Wang et al.,2024; Kipkebut, 2024; Mohamed Diab Idris et al., 2024), including the problem of misinformation (Mohamed Diab Idris et al., 2024). The loss of critical thinking because of over-reliance on LLMs is very often mentioned as a reason for deep concern (Wang et al., 2024; Yan, L. et al., 2023). Concerns about privacy of data and security are equally important (Wang et al., 2024; Kipkebut, 2024; MohamedDiab Idris et al., 2024; Gan, W et al., 2023). Apart from these, the general set of issues for realizing the idea comprises the limited AI reliability and technical capacity as well as its different effectiveness in various settings and the educators' lack of technological knowledge and inadequate infrastructural provision (Celik, I. et al., 2022). Ryan, P. et al. (2023) refer to the"black box" character of numerous AI systems, which impedes pedagogical understanding, and warns of AI potentially deepening educational inequities.

2.3 Gaps and Limitations in Existing Research

Though the existing literature base is quite comprehensive, it still reveals the crucial shortcomings and limitations in several areas. The need for empirical studies is recognized in the research works cited (Fagbohun, O. et al., 2024; Zhang, K., & Aslan, A. B., 2021) to assess the reliability and applicability of LLMs in education and the need to devise strategies for bias mitigation. Studies must use LLM more effectively, improve LLM literacy, deepen the understanding of human-LLM communication, and balance the confidence with the accuracy of using LLMs (Kumar, H. et al., 2024). There is an almost complete lack of clearly defined institutional policies, and the necessity for exploring the human-AI co-creation process, staff training, and the ethical issues of automated detection is noticeable (Perkins, M., 2023). Among the technical issues are the requirements for multilingual LLMs, more research on multimodal learning analytics, the potential for edge computing integration, and publicly accessible datasets for such areas as content creation and personalisation (Wang et al., 2024). There is also a limitation of teacher involvement in AI development, and so is the variety of data collection methods, while the need for more real-time feedback and AI systems that are technically and pedagogically capable is voiced (Celik, I. et al., 2022). Lastly, further studies on the influence of LLMs on the critical thinking skills and learning outcomes over time, the invention of reliable plagiarism detection tools, and the setting up of ethical frameworks are among the needs of the hour (Mohamed Diab Idris et al., 2024). Many of the identified gaps

also point to their studies' limitations, such as dependence on single databases or particular publication types (Zhang, K., & Aslan, A. B., 2021; Yan, L. et.al, 2023), or being limited by sample sizes and the extent to which the results can be generalized (Joshi, I. et.al, 2018; Kumar, H. et al., 2024). One of the key points Ryan, P. et. al. (2023) make is the need for more rigorous, evidence-based research that avoids techno-solutionism and, thus, focuses on pedagogical, ethical, and social issues of AI in diverse educational settings. Such a review reveals the complex and changing LLMs integration nature in education sectors. Many acknowledge the extent of advanced learning, efficiency, and personalized experiences through technologies; however, the issues of accuracy, bias, environmental and economic challenges, and the loss of critical thinking skills are still being debated. The current body of research is calling for more empirical studies, the setting up of ethical standards, and the drafting of an efficient implementation plan.

The current study aims to raise the discussion by providing an empirical account of students' views in an urban Indian context, specifically their usage patterns, perceived benefits and challenges, and the impact of critical thinking and independent learning, thus, it is partially bridging the gap in the existing literature identified.

3 Research Objective

RO1: To understand how the students are using LLMs for their academic purpose and how well they feel these tools actually work.

RO2: To explore the potential upsides and challenges of bringing LLMs into the learning process.

RO3: To find how students think LLMs are affecting their critical thinking skills and their ability to learn on their own.

HYPOTHESIS

H1: Based on Usage and Perceived Effectiveness

We assume that students who use LLMs more often will also see them as more helpful and effective than students who rarely or never use at all.

H2: Based on Benefits vs. Challenges

Overall, we expect students feel that the benefits of LLMs such as getting work done faster, feeling more engaged and having extra support outweigh the possible drawbacks such as biasness, dealing with mistakes or concerns about academic integrity.

H3: Based on Impact on Independent Learning

we believe the use of LLMs improves homework habits. Students can explore new topics, ask questions and study at their own speed.

H4: Based on Impact on Critical Thinking

We also think that depending too much on LLMs can actually restrict students critical thinking and imagination, especially when these tools are being used aimlessly or without thoroughly achieving the knowledge that is being transferred.

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Author(s) & Year	**Focus / Context of Study**	**Key Findings**	**Limitations / Gaps Identified**	**Aligned Research Question (RQ) & Hypothesis**
Fagbohun, O. et al. (2024)	Use of LLMs in assessments and grading.	LLMs enhance efficiency, consistency, and feedback quality; effective for evaluating creative and open-ended work.	Risk of depersonalization, data privacy issues, and bias; need for human oversight.	RQ2: What are the perceived benefits and the challenges of Integrating LLMs into Learning? H2: Students believe that the advantages of using LLMs outweigh the challenges.
Kumar, H. et al. (2024)	Impact of guidance-based strategies in LLM-assisted learning.	Structured guidance reduces irrelevant queries, enhances focus, and improves confidence initially.	Small sample; limited generalizability; need to explore human–LLM communication and optimal guidance balance.	RQ3: How does use of LLM affect student's critical thinking and independent learning? H3a: LLMs foster independence when used with proper guidance.H3b: Overdependence may hinder critical thinking.
Wang et al. (2024)	Broad survey on LLM use in education (global context).	LLMs support adaptive learning, content creation, and assessment.	Reliability, bias, privacy concerns; overreliance and critical thinking risks.	RQ1: How do students use LLMs for academic purposes? H1: Frequent users look on LLMs as more effective learning aids. RQ2: What are the perceived benefits and risks? H2:

				Benefits outweigh perceived risks.
Kipkebut, A. (2024)	Integration of LLMs in higher education (mixed-method).	LLMs support research, writing, and curriculum design; enhance performance and efficiency.	Accuracy and plagiarism concerns; need for ethics training and stakeholder engagement.	RQ1: How do students use LLMs for academic purposes? H1: Frequent use increases perceived usefulness and efficiency.
Mohamed Diab Idris et al. (2024)	Transformative potential of LLMs in higher education.	Democratizes access, accelerates research, personalizes learning; boosts efficiency.	Ethical and privacy challenges; risk of misinformation and credential dilution.	RQ2: What benefits and challenges arise from integrating LLMs? H2: Students recognize benefits but stress the need for ethical and guided use.
Yan, L. et al. (2023)	Review of 118 studies on LLM automation in education.	53 use cases identified; LLMs can automate teaching, grading, profiling, and content generation.	Low readiness, lack of transparency, limited replicability; ethical and privacy issues.	RQ2: What are the perceived challenges of LLM use? H2: While LLMs improve efficiency, students remain cautious about accuracy and fairness.
Perkins, M. (2023)	Academic integrity implications of LLM-generated text.	LLMs produce coherent, human-like text; existing detection tools are inadequate.	Lacks empirical validation; unclear institutional policies.	RQ2 / RQ3: How can institutions manage integrity concerns while encouraging learning? H4: Unregulated use may compromise

				critical thinking and academic honesty.
Gan, W. et al. (2023)	LLMs in smart education for personalized learning and feedback.	LLMs tailor learning experiences and support intelligent tutoring.	Data privacy, interpretability, and fairness issues.	RQ1 / RQ2: How do students use LLMs, to customize the learning experience and what risks come with that? H1–H2: the more students use LLMs, the more engaged they get but only if they stay aware of the tools limits.
Celik, I. et al. (2022)	Teachers' use of AI for planning, assessment, and implementation.	AI improves monitoring and assessment efficiency.	Technical limitations, lack of teacher training and infrastructure.	RQ1 / RQ2: What institutional supports are needed for responsible LLM use? H2: Benefits are recognized, but adoption depends on adequate infrastructure and training.
Zhang, K. & Aslan, A.B. (2021)	Review of AI in Education (AIEd) research trends.	Identified gap between AI's potential and practical adoption in classrooms.	Limited to one database; excludes recent global studies.	RQ2: What gaps exist in AI-driven education research? H2: Students perceived value of LLMs highlights an evolving but incomplete adoption process.

Joshi, I. et al. (2018)	LLMs (ChatGPT) in Indian undergraduate engineering education.	Improved information retrieval, summarisation, and time efficiency; positive faculty views.	Limited scope (engineering only).	RQ1: How are LLMs being used by students for academic purposes? H1: Students who frequently use LLMs find them more efficient and helpful.

4 Methodology

As to how we went about utilizing LLMs at our higher results school, this part has shown an in-depth description. The researchers endeavored to find out about students' learning habits, the effect that this software had on education and their fingers as well as whether it really made a difference to thinking critically or developing oneself as a person. Their methodology was to combine questionnaire data with interview material, and open-ended feedback. It helped them not only to obtain figures but also to understand the real experiences, perceptions, and challenges of students concerning LLMs.

In other words, they performed a thorough investigation of how students use these models and how that influences their mental efforts, learning, and critical thinking. Besides, they found the most common advantages and disadvantages that students encounter.

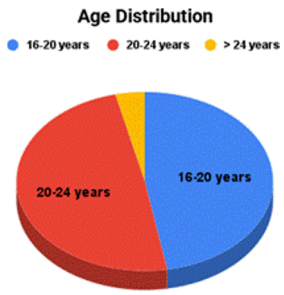
Essentially, this is about the student journey – how they employ LLMs in their studies and how these tools are useful. Students revealed their academic challenges and how, by using this technology, they managed to solve them. By combining the figures with their decisions and narratives, they bring out the human aspect of the technology. This method was selected very carefully to address the main questions of their research.

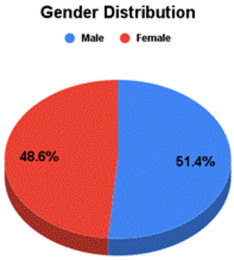
4.1 Participants and Setting

The participants in the study were the students that are pursuing both undergraduate Bachelor of Business Administration and postgraduate Master of Business Administration programs at the Urban Private Skill Tech University. The data came from students in Mumbai, India. This particular environment was a deliberate choice to understand and record the views of the newly admitted students of higher education. It was noticed that students were enthusiastic about and highly engrossed with emerging technologies like LLMs.

The first, hand data examination was based on 108 legitimate answers. The continuous verification of the given data brought quite impressive results. Every response was referring to certain criteria and the respondents' suitability, and the relevance was also correct. The data set was firm after the counterchecking, and the committed responses were the part of the research.

The demographic details of the respondents are summarized below.





The age distribution focused on young learners in orientation with the objective of the study to understand how the tech-savvy generation interact with new technologies. A balanced gender parity is ensured, and many different perspectives were represented in the insights and analyses related to the students' experiences of higher education. Their use of LLMs for academic support exhibited a precious, concise summary of how learners starting their academic journey are getting adventurous and amalgamating LLMs into their studies.

4.2 Data Collection Instruments

Data for this study was collected from both primary and secondary sources.

Primary Data Collection

Primary data for this study was gathered through an online survey created specifically for this research. The survey included a mix of 32 quantitative questions and 6 open-ended qualitative questions, making a total of 38 carefully designed items.

Quantitative Questions:

The study involved 32 questions and Likert scale was administered to understand the measure of consensus, frequency of definite behaviors and insights related to LLMs. These questions were demarcated into three areas directly corresponding to the research objectives.

i. **Current Usage Patterns of LLMs for Academics:** We first looked at the large language model (LLM) adoption situation and the characteristics of that adoption in detail. The questions were: "Have you used LLMs for academic purposes?", "How often do you use LLMs for academic purposes?", "For what purposes do you primarily use LLMs?", "How do you primarily access LLMs?", "Have you received guidance from your teachers in using LLMs?", "LLMs help me understand complex academic topics more effectively?", "Educators should be a guiding source to students and be honest and straightforward about how LLMs can be used in assessments."

Verbatim of the responses

“LLMs have positively influenced my learning experience,” “LLMs are becoming progressively crucial tools for students in higher education,” “Teachers and schools should promote the proper use of LLMs.”

- **Benefits and Challenges Associated with the Use of LLMs in Education:**

This segment focused on student perceptions of LLMs' impact on their learning experience, efficiency, and academic integrity. It featured such statements as: "Using LLMs has made learning more engaging and interactive, " "LLMs help me complete academic tasks more efficiently, " "They improve the quality of my assignments and projects, " and "I use LLMs to brainstorm and generate ideas." Students were also surveyed about their opinions regarding feedback and exam preparation, with questions like "The feedback from LLMs helps me improve my work" and "LLMs make it easier for me to prepare for exams." Moreover, the section explored ethical and reliability issues through such statements as "Assignments that include LLM use are more interesting, " "LLMs may encourage academic dishonesty, " "The benefits of LLMs outweigh the risks, " "I worry about LLMs giving inaccurate information, " and "I am concerned about academic dishonesty among my peers due to LLMs."

- **Impact of LLMs on Critical Thinking and Independent Learning:**

This part aimed to comprehend the opinions of the students regarding the impact of their use of large language models (LLMs) on their cognitive skills and independence in learning. The students were provided with such statements as: "I am concerned that relying on LLMs might limit my critical thinking, " "LLMs make me feel more independent in my learning, " "Using LLMs encourages me to explore topics beyond my curriculum, " and "I worry that overusing LLMs for assignments could reduce the originality of my work."

Qualitative Questions: Six open-ended questions were designed to get rich insights and examples from the participants, providing deeper context and individual narratives. These questions were:

- “Could you describe an example of how LLMs have helped you explore a topic beyond your curriculum?"
- “How do you think LLMs should be integrated into assessments to encourage both learning and independent thinking?"
- “How do you think LLMs will impact the learning experience of students in the future?"
- “If you could design the perfect LLM for helping you learn, what features would it have?"
- “How do you feel about the idea that professors might use AI to grade or provide feedback on your work?"
- “Do you feel the use of LLMs fosters independence in learning, or does it create reliance? Why?"

Secondary Data Collection

Secondary data for this study was put together through a very detailed, methodical current literature review. It consisted of relevant, suitable scholarly articles, research papers, and journals directed at large language models, AI in education, and their effects on the educational sector. The results and proof from the data collection were extensively documented in the literature review section of this paper. It conveys a deep comprehension of the research gap which is indispensable for the present generation.

4.3 Data Analysis

Quantitative Data Analysis:

Descriptive statistics will be the main tools to interpret the data from survey scales of the quantitative part of the study. To get a clear picture of the perception of the respondents and their behavior, it will be necessary to calculate such measures as averages, percentages, and frequencies.

Qualitative Data Analysis: Open, ended responses from students will be evaluated through thematic analysis. This analysis is a detailed method that recognizes the themes, ideas, and concepts from the text and then groups these under the broad headings. Such a process will provide a better understanding of the students' experiences and views. The results of this analysis will serve as a qualitative supplement to the quantitative data, thus, providing a more detailed and contextualized understanding.

Data Analysis and Statistical Methods:

The quantitative data provided by 108 genuine students were analyzed by descriptive and inferential statistics in IBM SPSS. The demographic data, frequency of LLM use and perceived pros and cons of the LLM were described by descriptive statistics such as frequency, mean and percentage. The reliability of multi, item constructs such as Perceived Effectiveness, Perceived Benefits and Critical Thinking Concern was confirmed by Cronbach's alpha which was more than 0.70 for all scales and internal consistency was confirmed.

This inferential analysis comprised:

1. The relationship between the frequency of LLM use and perceived effectiveness (H1) is investigated using the chi-square test of independence.
2. Undergraduate (BBA) and graduate (MBA) students' perceived benefits are compared using an independent samples t-test (H2).
3. Spearman's rho correlation analysis is used to assess the association between the frequency of LLM use and worries about its effect on critical thinking (H4).

Every test was two-tailed with a significance level of 5% ($\alpha = 0.05$). Prior to using parametric tests, the normality and homogeneity of variance were confirmed.

5 Results

The findings sections are followed by the presentation of the mixed-method survey results with the participants.

First of all, the survey responses from students engaged in the research indicate that the large language models (or LLMs) are widely considered good co-operators for breakthrough the traditional learning contents. Most of the respondents affirmed that LLMs are the interactive collaborators who especially helped them with the application of the real-world scenarios, the investigation of the complex subjects and the practical abilities development in the fields of marketing, finance, programming, and creative writing. Participants appreciated especially the creativity of LLMs, easy explanation of difficult concepts, and the offering of quick and context-specific solutions as these helped academic project quality and increased classroom participation in general.

Also, the results depicted that the majority of the participants were positive towards LLMs as a resource for supplementary research, ideation, and getting feedback for assessments To ensure the development of independent thinking and creativity, they emphasized that such involvement should be supported by regulations. They considered prompt engineering as a very important skill in LLMs interaction for getting the best results without a heavy usage of them.

Students have weighed the pros and cons of the potential effects of LLMs on their future learning. The positive sides were better access to information, improved critical thinking skills, and more efficient problem-solving. On the other hand, it was argued that overdependence on LLMs would cause loss of originality, creativity, and the development of independent analytical skills. The effect that was believed to differ based on the student profile, where average users were more likely to become dependent and, on the other hand, high achievers were expected to benefit the most.

Respondents envisioned the “ideal" LLM as having many features such as constant updates, multimodal capabilities, personalized learning paths, interactive quizzes, fact-checking tools, integration of emotional intelligence, and adaptive feedback mechanisms. A lot of attention was given to its ethical usage and the avoidance of “spoon-feeding" or oversimplification.

While a majority of participants were able to recognize the benefits of AI-assisted grading in terms of speed, impartiality, and consistency of judgement, they also acknowledge the limitations which call for human intervention to ensure that the grading is contextually accurate, that the potential biases are dealt with, and the qualitative will be preserved in the assessment process.

Furthermore, various thoughts and ideas are expressed regarding the usage of LLM and if students are dependent or independent on this magical journey. It was evident that LLM's made it smooth for the students to learn, revise, relearn and practise at their own speed and leisure. Self-guidance, self-learning turned into a routine. Introvert students were thrilled with the process as they hesitated to have direct academic learning. However, the constant usage of short cuts which are unquestioning, uncritical and unconscious does not guarantee that learnings have been imbibed and registered in the student's mind. It is universally consented and acknowledged that instructional strategies are decisive and pivotal in the learning and development of students.

Demographic Profile of Respondents

Table 1 presents the demographic distribution of respondents. The majority were undergraduate students aged below 20, with an approximately balanced gender ratio. Most respondents were first-year students, indicating early adoption of LLMs among new learners.

Table 1. Demographic Profile of Respondents

Variable	**Category**	**Frequency (n=108)**	**Percentage (%)**
Gender	**Male**	**56**	**51.9**
	Female	**52**	**48.1**
Education Level	**Undergraduate**	**(majority)**	**-**

Frequency and Purpose of LLM Use

Most students reported using LLMs weekly or daily for academic purposes such as understanding concepts, completing assignments, and writing summaries.

Table 2. Frequency of LLM Use

Frequency	**Count**	**Percentage (%)**
Weekly	57	52.8
Daily	43	39.8
Monthly	4	3.7
Rarely	4	3.7

Perceived Effectiveness and Benefits of LLMs

Students rated their agreement with benefit-related statements on a 5-point Likert scale.

Table 3. Students' Perception of Benefits of LLMs

Response	Count	Percentage (%)
Agree	42	38.9
Strongly Agree	22	20.4
Neutral	38	35.2
Disagree	6	5.6

Statistical Analysis

To statistically evaluate the proposed hypotheses, a series of following inferential tests were conducted, as summarized in **Table 4**:

a) Chi-square Test (H1): A Chi-square test of independence examined the relationship between frequency of LLM use and perceived effectiveness categorized into Low, Moderate, and High groups.
b) Independent Samples t-Test (H2): To test H2, perceived benefit scores were compared between undergraduate (BBA) and postgraduate (MBA) students.
c) Correlation Analysis (H4): To evaluate the relationship between LLM usage frequency and concern for critical thinking, a Spearman's rho correlation was performed.

Table 4: Summary of statistical analysis

Test	Hypothesis	Statistic	df	p-value	Interpretation
Chi-square	H1: Frequency × Perceived Effectiveness	$\chi^2 = 9.16$	9	0.423	Not significant
t-test	H2: BBA vs MBA Perceived Benefits	$t = 1.29$	106	0.201	Not significant
Spearman ρ	H3b: Frequency × Critical Thinking Concern	$\rho = 0.17$	-	0.099	Weak positive trend

Inferential analyses showed that there were no significant differences between groups statistically; however, some directional trends were noticed. The Chi, square test ($\chi^2 = 9.16$, p

= 0.423) and t, test (t(106) = 1.29, p = 0.201) signaled that effectiveness and benefits perceptions were alike across different usage levels and academic programs. A weak positive Spearman correlation (ρ = 0.17, p = 0.099) implied that increased LLM usage might lead to a higher understanding of its use for critical thinking.

6 Discussion

This research presents a single, size, fit understanding of LLM utilization at a city university in India, by means of quantitative and qualitative data to probe student perceptions in a comprehensive, holistic academic literature. The findings excavate and reveal a robust overlap of the local studies with the global ones, while pointing out the context, specific differences and variations. Mainly in ethical integration and personalized impact of the ecosystem.

H1: Usage and Perceived Effectiveness

Almost all of the adoption rates (99.1%) reinforces H1 strongly, showing that students who frequently use LLMs consider them effective and valuable. LLMs are, for the most part, students' interactive collaborators with whom they extend their learning in areas like creative writing, finance, and marketing. The result here is consistent with the findings of Kipkebut (2024) and Wang et al(2024) who found the most frequent usage to be research, writing and study aids. Our results also show that students in India use LLMs to get immediate explanations and to come up with creative ideas for their projects, which is also in line with Joshi et al (2018) who reported that time-saving benefits and better quality of work were some of the advantages in Indian higher education.

H2: Benefits vs. Challenges

H2 (benefits outweighing the risks) received partial support from most people (59.3%) who agreed with the statement, although a significant number of people (35.2%) who remained neutral were also noticeable, reflecting a 'balanced and cautious' standpoint. Students recognized benefits and reported very high agreement on improved academic quality, increased learning engagement, and better brainstorming support. This alignment corroborates Fagbohun et al(2024)'s point on efficiency and personalized feedback as well as Idris et al(2024)'s findings on the democratization of knowledge access.

On the other hand, students were deeply worried about academic integrity (67.6% of them were concerned) and accuracy (70.4% of them were concerned). These worries, in particular, the fear of LLMs hallucinating, match with Perkins(2023)'s findings that invention in LLM text threatens academic integrity, and Wang et al. (2024) identification of universal reliability and bias issues, confirming that accuracy is still the main challenge even in different locations. (Yan et al., 2023).

H3 and H4: Impact on Independent Learning and Critical Thinking

Our results confirmed both H3 and H4, showing a paradoxical perspective with respect to learning outcomes. On the one hand, students indicated that LLMs helped them to be more independent as they were able to explore on their own, on the other hand, they expressed a

strong concern that an over-reliance on LLMs may lead to a decrease in their ability to think critically (H4).

This conflict is in line with Kumar et al. (2024) findings that the effective use of LLMs needs well-developed guidance to avoid dependence. The issue of LLMs leading to the disruption of crtical thinking, which is in agreement with Wang et al. (2024) and Yan et al. (2024), is the authors' main point. Our study is important in providing nuance by suggesting that the LLM effect is very different from one person to another: high achievers may be in a position to benefit, whereas average users are more likely to become dependent, thus pointing to the necessity of setting-based guidance (Idris et al., 2024).

Implications of Pedagogy

Considering the advantages and disadvantages of a dual effect on learning, the main problem for teachers is not to stop but to morally use LLMs in higher education. Our findings call for a change in examinations from simple memorization to the evaluation of the extent to which students interact with and improve LLM results. Students also preferred formal instruction, thus confirming Kipkebut(2024)'s argument for the necessity of educational activities concerning the ethical use of AI. This strongly supports the need for incorporating LLM literacy and prompt engineering as part of the new era curriculum. Besides that, the contrasting opinions about AI grading point to a compulsory human-in-the-loop approach (Fagbohum et al. 2024), where AI is used for the sake of work completion but the human is still there to give the final verdict and ensure the ethical aspect of it.

Limitations, Contributions and Future Research

While our study provides valuable insights into LLM usage in the Indian higher education context, it shares some limitations with the existing literature. Comparable to Kumar et al. (2024) and Joshi et al (2018), Our study has a bounded and meagre sample size and delves on a specific institutional context, which may limit validity. Further, like Zhang & Aslan (2021) and Yan et al. (2023), our study represents a summary of a quick growing LLM usage fabric. Nonetheless, our study contributes to the research gaps which were spotted in the existing literature, distinctly showing the requirement for more verifiable, factual research in diverse educational settings. The data derived from an urban Indian context, with additional research angles in a developing country is exclusive to the contextual gaps. The corroboration of the findings with the literature is beyond various contexts, disciplines and geographical ecosystems. The study reveals subtle variations with the current literature as LLM’s in silos have repercussions in the cultural and institutional set ups and its utility in various scenarios.

Future studies can be on how evolution of LLM has occurred and the learning outcome in the academic framework. Recommendation to study intercultural, cross national studies, cultural comparison and integration of LLM’s in education can be explored. The movement of LLMs being a revolutionary creation and ground breaking technology a comparative study between local and global can be ventured into.

7 Conclusion

This mixed-methods study provides empirical evidence regarding the integration, user-assessed efficacy, and effects of LLMs among undergraduate and postgraduate students in a specialized, urban Indian higher education context. The result concluded that amalgamation of large language models revealed an everlasting academic shift which is crucial and an immediate attention can be thought of with respect to the pedagogy. The research highlights unwavering support for the high repetition and recurrence of LLM usage. Students feel that the tools are precious as the learning is in a jiffy, concepts can be revised and bring out creative plans. The findings reveal and indicate that it is in confluence with global literature, specifically the learning support and pace is well accepted by the learners.

The major findings of this study are contradictory in the learning outcomes as students exhibited self-awareness and exclaimed that they would be over dependent. The expectations from students were high and were under the impression that original ideas were crushed and there was no attempt to think anew. This twofold explains that the tools are a personal learning pathway as it caters to high achievers and slow learners nevertheless absorption in a huge scale might be a threat.

Institutional interventions with respect to academic authenticity and the illusion of facts seems to be a comprehensive challenge in the higher education ecosystem.

In light of the findings, exclusively ethical limitations of LLM's is equally important. Students mandatorily should be trained on crafting the right questions to get an appropriate response and maximize the benefits. Nonetheless humanizing the approach will provide an intellectual, cognitive thinking process which is symbiotically accentuated by technology.

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