Abstract

Integrating Artificial Intelligence (AI) tools, especially Large Language Models (LLM) such as ChatGPT, into higher education represents a transformative shift in educational paradigms. These technologies enhance pedagogical methods and deeply influence student-teacher dynamics and the overall learning environment. This thesis critically examines the ethical, behavioural, and social ramifications of deploying LLMs in university settings, assessing their potential to improve academic outcomes and the associated risks, such as increased incidents of plagiarism, reliability concerns, and the potential erosion of critical thinking skills.

Employing a qualitative research methodology paired with a phenomenological approach, this study gathers data through online surveys and semi-structured interviews with university students and teachers. These methods illuminate the nuanced impacts of ChatGPT on educational practices and student engagement. The theoretical framework guiding this investigation, the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), offers a comprehensive lens to evaluate the adoption dynamics of LLMs in academic environments. This framework facilitates an in-depth analysis of factors such as utility, ease of use, and the enjoyment derived from using LLM technologies like ChatGPT while scrutinizing broader ethical, social, and behavioural consequences.

Preliminary findings reveal a complex interplay between technology acceptance and ethical considerations. The results underscore the critical need for establishing uniform policies and rigorous ethical oversight to integrate AI tools effectively in educational settings. This study highlights the dual potential of LLMs to revolutionize and complicate educational processes, suggesting that successfully implementing such technologies requires balanced strategies that prioritize innovation and ethical responsibility.

This expanded inquiry not only broadens our understanding of how LLMs like ChatGPT are reshaping higher education but also serves as a foundational discussion for future research to optimize AI applications in academic contexts while safeguarding ethical standards and fostering equitable access.

Keywords

Large Language Models (LLMs), ChatGPT, Artificial Intelligence (AI), Unified Theory of Acceptance and Use of Technology 2 (UTAUT2).

Acknowledgments

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Abbreviations

Abbreviations	Full Name
AI	Artificial Intelligence
API	Application Programming Interface
ChatGPT	Chat Generative Pre-trained Transformer
EE	Effort Expectancy
FC	Facilitating Conditions
GPT	Generative Pre-trained Transformer
HCI	Human-Computer Interaction
HM	Hedonic Motivation
HT	Habit
IDEE	Identify, Determine, Ensure, Evaluate
IS	Information System
LLM	Large Language Model
NLP	Natural Language Processing
Open AI	Open Artificial Intelligence
PE	Performance Expectancy
PV	Price Value
SI	Social Influence
UTAUT2	Unified Theory of Acceptance and Use of Technology 2

1. Introduction

This chapter presents the basic components of the master's thesis. It begins by outlining the background and research environment and what has been observed in previous studies. Continue with the purpose statement and research questions. The topic justification, scope and limitations, and thesis organization are then provided.

1.1.   Introduction and Research Setting

In recent years, the incorporation of artificial intelligence (AI) tools into various elements of education has emerged as a revolutionary force, altering the learning landscape in higher education institutions. Among these AI tools, Chat Generative Pre-Trained Transformer (ChatGPT) stands out as a shining example, transforming how students engage with course materials, teachers, and one another. ChatGPT, an advanced language model developed by Open Artificial Intelligence (Open AI), can generate human-like text responses based on input prompts, allowing for more natural and engaging interactions. ChatGPT stands as a pioneering technological marvel, ingeniously harnessing sophisticated AI methodologies to craft remarkably natural language responses tailored to any given prompt or input. This groundbreaking innovation has transcended boundaries, finding applications across a diverse array of domains, ranging from natural language processing (NLP) to customer service, and extending its reach into the realm of content creation (Kalla, et al., 2023).

Large language models (LLMs), Kalyan (2023), are a specific category of pre-trained language models created by increasing model size, pre-training corpus, and computing. Because of their vast size and pretraining on large volumes of text data, LLMs have unique abilities that allow them to perform exceptionally in many natural language processing tasks without requiring task-specific training. The era of LLMs began with Open AI's Generative Pre-trained Transformer3 (GPT3) model, and their popularity has grown tremendously since the launch of models such as ChatGPT and GPT4.

AI technology integration into educational settings has drawn more attention recently as educators look for creative ways to improve learning outcomes and experiences. LLMs, like ChatGPT, are among these technologies that show promise in promoting human-computer interaction in educational settings. In the information systems (IS) field, human-computer interaction (HCI) is vital to developing, applying, and assessing these AI-driven systems. Harnessing the cutting-edge advancements in AI and NLP, GPT emerges as a formidable instrument for amassing and scrutinizing information conveyed through natural language. Its prowess lies in its ability to swiftly and precisely process and analyze vast troves of textual data, rendering it an invaluable asset across a multitude of applications. While AI-driven GPT models possess remarkable potential for generating insights and information, they are not intended to supplant human decision-making processes. Instead, they serve as powerful adjuncts, augmenting human decision-making capabilities by furnishing supplementary information and insights that can illuminate and inform judicious decisions (Aithal & Aithal, 2023).

LLMs are being criticized for copyright infringement, inadvertent bias in training data, a danger to human innovation, the possibility of distributing incorrect or misleading information, and prejudice. Due to their popularity among students, the introduction of many comparable apps, and the inability to resist unfair and fraudulent student usage, their educational use must be

adapted and harmonized. The incorporation of LLMs should be defined not only by pedagogues and educational institutions but also by students who will actively utilize them to learn and prepare assignments (Zdravkova et al., 2023).

This research explores the dramatic impact of LLMs, predominantly ChatGPT, on learning in higher education settings. The integration of AI tools has the potential to usher in a new era of education by increasing student participation and collaboration, personalizing learning experiences, and supplementing instructional approaches. This study aims to provide insights into the evolving role of technology in defining the twenty-first-century educational landscape by thoroughly evaluating the benefits, problems, and future opportunities connected with AI-driven learning, where the focus is given to the ethical, behavioural, and social aspects of LLMs.

For instance, the issue of plagiarism in educational settings may be exacerbated by the availability of AI-powered technologies like ChatGPT, which may incite students to falsify their academic work by passing off AI-generated outputs as their own (Williams, 2024). This problem is especially critical in educational environments prioritizing results or final products over the learning process, like qualifications or grades.

This thesis also addresses ethical, social, and behavioural issues with dependability and accuracy, as well as significant problems with security, privacy, and ethical ChatGPT use in educational environments. Vargas-Murillo et al. (2023) stated that although a very advanced chatbot, ChatGPT has drawbacks that could prevent students from developing their critical thinking abilities. These emerge from the fact that instead of actively engaging with the content educators provide, students depend more on this AI technology to answer questions during their learning process. Several scientific societies discourage using ChatGPT because of the possibility of illogical behaviour and a lack of critical thinking.

The authors of this study used the qualitative research approach and phenomenological study methodology to collect data from university students and teachers through two methods: online surveys and interviews. In the following sections, we will examine previous research on this topic and the knowledge gap noted by other experts. We further address this study's research question, scope, and limitations. Furthermore, an explanation of the research approach, literature review, and expected contributions will be offered.

1.2.   Purpose Statement and Research Questions

The primary goal of our thesis is to investigate the impact of LLMs like ChatGPT on university students and instructors, including usage patterns, perspectives, academic performance, information retention, evaluation, critical thinking, and ethical implications. The research question investigates the ethical, behavioural, and social impact of LLMs such as ChatGPT on interactions between students and instructors, attitudes, and learning methods.

RQ. What impact does a Large Language Model like ChatGPT have on the traditional higher education dynamics from an ethical, behavioural, and social standpoint?

1.3.   Topic Justification

Khlaif et al. (2023) state that standardized procedures and recommended practices for using ChatGPT in scientific research still need to be improved. These gaps show that more research is required to determine the ethical and sociological ramifications of utilizing AI in scientific

inquiry and to examine the efficacy, accuracy, and reliability of ChatGPT when used for scientific research. To maintain safe procedures and consider the necessary ethics of scientific research, it is crucial to investigate the issues surrounding the use of ChatGPT in academic settings.

The knowledge gap on LLM's effects on university students and their instructors, especially concerning problems like ethical dilemmas, points to an important field of study that must be investigated further. Although the usage of LLMs, like ChatGPT and related conversational agents in educational contexts, is becoming more popular, there is still a lack of thorough knowledge about the problems and ethical ramifications of doing so.

According to Huallpa et al. (2023), several research avenues could be investigated to understand better the ethical ramifications of integrating Chat GPT into higher education. First, qualitative research techniques like focus groups and interviews can provide a deeper knowledge of the study's participants' problems, viewpoints, and experiences. A longitudinal study might also investigate the long-term consequences of using Chat GPT on student outcomes and teaching practices. A comprehensive understanding of the ethical challenges and opportunities associated with Chat GPT could also be obtained by investigating the perspectives of educators and school administrators.

LLMs' like ChatGPT's interactions with students and teachers may raise ethical concerns in several areas, such as data privacy, algorithmic bias, accountability, and transparency. Investigating LLMs' possible effects on students' agency, autonomy, and well-being is also necessary. It is critical to consider how ChatGPT's interactions with students may affect their decision-making processes and learning experiences as AI-driven conversational agents become more incorporated into educational contexts.

Furthermore, institutional regulations and guidelines for the moral application of AI-driven technologies in education might need further development to protect student rights and encourage responsible AI deployment. Closing the knowledge gap about ChatGPT's effects on college students and instructors is essential for shaping evidence-based practices, policy choices, and technology design in higher education, especially regarding ethical issues.

1.4.   Scope and Limitations

The scope of the thesis is to examine the use of LLMs like ChatGPT in higher education settings. To investigate the challenges of using ChatGPT, we will look from the perspectives of the students and teachers. We emphasize the ethical, behavioural, and social challenges this AI language model raises. We aim to provide additional information regarding LLM's effects on college students and their instructors. The study focuses on the perception of both university students and teachers. The study was conducted mostly in Swedish universities and universities from different geographical locations, and the data was collected through interviews and online surveys.

This research will be subject to certain limitations. The intended groups might not be generalizable because they exclude other groups, such as high school students and their teachers, who are heavily involved in the same learning environment. One might even consider it a limitation because no other groups, such as some research institutions, that use LLMs like ChatGPT did not participate. Moreover, the study's sample size will not universally represent all university students and instructors.

Due to the possibility of non-random recruiting, there is a chance that the selection of participants has been compromised. In addition, a volunteer participant might not react in the same way as those who choose not to participate in the research. Furthermore, some users might respond in a socially acceptable or desired way rather than sharing their genuine thoughts on LLMs or ChatGPT experiences. These are the usual constraints that one would anticipate from such a study; other minor limitations might also be found.

1.5.   Thesis Organization

This thesis is divided into seven chapters with multiple sub-sections designed to facilitate a logical reading pattern. The second chapter, Literature Review, is presented below, followed by the third chapter, demonstrating the theoretical framework adopted for this thesis. Chapter four, Methodology, describes the nature of the research approach, data collection methods, and data analysis procedures. The fifth chapter, Empirical Findings, displays the data gathered from participants via interviews and an online survey. In chapter six, Discussion, the empirical results are examined. Finally, in chapter seven, Conclusions, the thesis will be summarized, and additional research areas will be indicated. The references and appendices are presented at the end of the document.

2. Review of the Literature

This chapter assesses the existing research and academic discussions regarding the impact of LLMs, such as ChatGPT, on higher education. It explores various aspects of LLM application, such as pedagogical consequences, ethical considerations, technical adoption, and social factors influencing their use in educational settings.

2.1. Search Process

The search began with the "basket of eight journals" and started extended searching on other key journals. The search procedure is carried out using the Scopus database and Google Scholar. Initially, the search focused on papers which use different approaches and methods in ChatGPT usage in higher education, impact and ethical considerations and mentioned the term "ChatGPT" in the title, abstract, keyword and "student" in the keyword and including "University", "ethical", "impact". There are elements of an article that are not eligible to be included in the Literature review when only a study-based article on observational design is excluded. Also, the study published other than the English language is excluded. The inclusion criteria for this literature review are to select more cited articles. Since this topic has no relevant research done before 2023. ChatGPT is a new research topic, and articles from 2023 are included in this study. The targeted participants are students' technology specialists and people from the higher education sector (University level). The review is conducted on papers from different geographical locations. Articles using an empirical approach and semi-structured interviews, interviews and surveys as a method of data collection for the research are included in this study

2.2. AI technologies

Interdisciplinary research in the learning sciences has helped us understand a lot about how humans learn. As a result, we now know how to educate and train individuals more effectively. This same amount of knowledge must now be applied to improve the development of AI technology for educational and training applications. AI algorithms and technology may then assist us in providing quicker, more nuanced, and customized scaffolding for learners. However, most commercial AI developers are unfamiliar with learning sciences research and thus frequently have minimal knowledge of learning or teaching. (Luckin & Cukurova, 2019). Although AI primarily focuses on computing, it can also reason, perceive, and act. In other words, AI technology comprises intelligent robots or software that can think like humans. Nowadays, AI is used in a variety of disciplines, including education, marketing, consumer behaviour research, data recording of previous purchases, competition assessment, and so on. AI assistants, such as chatbots, employ natural language processing to automatically react to simple customer questions with e-voice instructions and provide recommendations. Chatbots are built on machine learning algorithms and may act like people (Castillo & Taherdoost, 2023).

Using an AI-generated essay as one's work may be considered contract cheating. However, utilizing built-in predictive text provided by word processors or having Grammarly make ideas to better one's writing may be viewed as legitimate technology applications. As the number of students and researchers who utilize AI-powered technologies to perform their duties continues to expand, studies have produced contradictory findings and suggestions about using AI-

powered technology in academia (Gustilo et al., 2024). The effectiveness of a Chatbot is determined by the size and precision of its databases since larger databases tend to improve performance. NLP technology is used to create Chatbots, which allow robots to perceive, analyze, and interpret human discourse. Pioneering Chatbots like Eliza, Parry, and Alice developed many decades ago, and as technology advanced, contemporary Chatbots such as Apple Siri, Microsoft Cortana, and Google Assistant were created. When communicating with people, these new Chatbots display more sophisticated communication capabilities (Ngo, 2023).

2.3. Large Language Model (e.g., ChatGPT)

Generative AI, such as ChatGPT, has potential applications in various fields, including business, education, healthcare, and content creation. ChatGPT has caused significant disruptions and changes in the realm of education. ChatGPT can aid with learning and teaching activities. ChatGPT can help students with various tasks, including searching for information, answering questions about certain subjects, and improving their writing skills in many languages (Fui-Hoon Nah et al., 2023). LLMs are computational systems trained on massive amounts of human-authored material from various internet sources. They enable a new generation of sophisticated and clever software systems to have a representation of how people use language for everyday communication, giving them the capacity to replicate human thought, in this instance, writing. The GPT model is the most popular among LLMs, with ChatGPT, which is based on GPT-3, demonstrating its potential (Gustilo et al., 2024).

ChatGPT, based on LLMs, can be used to create educational content, personalize learning experiences, and improve student engagement, improving education delivery's overall efficiency and effectiveness. ChatGPT can assist with problem formulation, research design, data collection and analysis, and reviewing and critiquing the writing and composition of academic research. It can also provide tailored support, direction, and feedback (Fui-Hoon Nah et al., 2023). One of ChatGPT's distinguishing advantages is its ability to maintain a "conversational style" with a constant personality throughout a debate. Instead of replying randomly, this allows for a more realistic and authentic debate. To do this, ChatGPT has been trained on vast datasets of conversational text, such as chat transcripts, forum entries, and social media posts (Ngo, 2023).

Envision Glasses are AI-powered smart glasses that allow those who are blind or have limited vision to live more freely. This assistive wearable device utilizes ChatGPT and Google Glass hardware to record and transform visual information surrounding the user into speech (Wei, 2023).

2.4. ChatGPT Usage in University Education

ChatGPT, an instruction-tuned text generator, has gained popularity in conversational interfaces due to its flowing prose. While new capabilities are amazing, they should not overshadow the hazards associated with proprietary systems. Open research drives advancement in science and engineering. Modern technology heavily relies on open research, which is typically supported by the public (Liesenfeld et al., 2023). The incorporation of ChatGPT, a sophisticated language generation model driven by AI, has gained popularity in university education. This technology shows potential for improving numerous aspects of the learning process. ChatGPT's capacity to read and create human-like writing enables personalized interactions, real-time help, and collaborative learning, transforming traditional educational dynamics. One possible use of ChatGPT is in higher education, where it offers a

chance to examine the goal of evaluation and how it may improve learning. Instead of just relying on software for evaluation, institutions may employ ChatGPT to teach critical thinking, writing, and the importance of AI in today's environment. In this sense, ChatGPT is seen as a helpful tool in creative and inclusive teaching, learning, and evaluation that promotes a transformational relationship with information (Strzelecki, 2023). ChatGPT helps students by providing constructive feedback on their work, assisting in essay writing, and promoting problem-solving. Teachers may utilize ChatGPT to create material, including course plans, presentations, quizzes, coding, grading, and scientific publications (Ngo, 2023).

According to Kumar, et al. (2022) advanced algorithms known as LLMs possess the capability to produce and modify text, positioning them to revolutionize language education and written evaluations. These models enable the automated creation of text that can fulfill specific criteria of conventional assessments, including essays. Although it remains impossible to conclusively detect text generated by LLMs, educators can discern certain patterns. By leveraging this knowledge, they can modify their assessment strategies to mitigate the potential effects of these tools on academic honesty. Problems with academic integrity could spread widely and have a big impact on evaluation. Conversely, this kind of AI, dubbed LLM, may be utilised to tackle the issue of languages. The integration of ChatGPT into educational settings presents both immense potential and significant hurdles. A tripartite framework encompassing teacher, student, and AI is poised to become an essential component of future educational paradigms. While ChatGPT technology introduces novel approaches and innovations to enhance teacher-student dynamics, it also introduces risks that warrant careful consideration and practical exploration. This exploration is crucial for fostering the ongoing evolution of an increasingly multifaceted educational landscape (Lin et al., 2023).

According to Firat (2023), who investigated the implications of ChatGPT for students and universities by examining the perceptions of scholars and students, AI technologies, such as ChatGPT powered by GPT-4, have shown tremendous promise in transforming how students learn and engage with information. As these AI-powered technologies grow more powerful and accessible, it is critical to investigate their influence on students and educational institutions, especially universities (Firat, 2023). Another possible use for GPT-3 in higher education is the development of interactive, game-based exams (Cotton et al., 2023). ChatGPT, a sophisticated conversational chatbot built by OpenAI, has the potential to assist the integration of AI into teaching and learning by providing teachers with an easy-to-use instructional tool. ChatGPT, which launched in November 2022, has claimed to be a useful tool in an educational setting for both students and teachers (Ngo, 2023). ChatGPT will eventually become a part of everyday writing in some way, much as calculators and computers have in maths and science (Rudolph et al., 2023). Some of the publications are merely letters, opinions, or editorials and may not have undergone official review. This is because the usage of ChatGPT in academics and higher education is very new and is being investigated (Strzelecki, 2023).

Educators are encouraged to actively adopt AI chatbots like ChatGPT as potent instruments for instruction, research, and academic service. By acquiring knowledge and training in AI technologies, faculty can gain a comprehensive understanding of their potential and constraints, devise assessment methodologies to mitigate academic dishonesty, and pioneer innovative pedagogical approaches in anticipation of future advancements. In an era dominated by AI, conventional learning paradigms are likely to become obsolete. Students will increasingly turn to AI for solutions to a wide array of challenges, spanning from culinary tasks to computer programming. Moreover, they may harness AI tools to enhance existing solutions and exercise their creative faculties to devise novel approaches to future problems, unlocking a realm of boundless possibilities (Dempere, et al., 2023).

Teachers play a vital role in helping students overcome their dependence on technology, which can impede the development of critical thinking and problem-solving skills if students overly rely on LLMs for assistance. Therefore, educators must design curricula that encourage deep engagement with the material and create assessments that require more than rote memorization of AI-generated facts. As AI technology continues to advance and students become more adept at using it, it is essential to recognize that while AI-assisted learning can enhance educational processes, it cannot replace the indispensable human interaction in education (Vargas-Murillo et al., 2023).

One of the primary benefits of AI language models is their ability to facilitate asynchronous communication. This feature has improved student engagement and cooperation by allowing students to pose questions and debate subjects without being present simultaneously (Cotton et al., 2023). According to Lo (2023), immediate action is needed to improve evaluation techniques and institutional rules in schools and institutions. Instructor training and student education are also required to address the influence of ChatGPT on the educational environment. Another feature of chat APIs is their ability to enhance student cooperation. For example, chat APIs may form student groups, allowing them to collaborate on projects and assignments. ChatAPIs may be utilized to support remote learning. This is especially beneficial for students who are unable to attend class due to physical or mental health problems. One potential use for GPT-3 in higher education is the development of personalized evaluations. GPT-3 might be used to create personalized tests or quizzes for each student depending on their specific requirements and skills (Cotton et al., 2023). According to Rasul et al. (2023), ChatGPT has become a juggernaut in the higher education sector, particularly in tertiary education, from the views of both students and professors. Furthermore, they have the potential to help academic learning designers accomplish their duties more effectively. If a student uses AI to generate an output and transform it into an acceptable piece of work for submission, they must do a literature search to identify papers authored by relevant writers who say the same things as the naively reasoned AI piece. That is, they would be required to carry out the literature review assignment that was originally specified (Howell & Potgieter, 2023).

Chat APIs and GPT-3 have the potential to provide several benefits to higher education, including greater student involvement, cooperation, and accessibility (Cotton et al., 2023). However, the variety of solutions to the same topic makes it difficult to identify plagiarism or cheating. Students and researchers may use the technology to cheat, hurting teaching and academic integrity (Wu et al., 2023).

2.5. Long-term perspectives and challenges

Valid concerns have arisen considering the potential obstacles of AI deployment in higher education, including the risk of overreliance on AI help, which might compromise critical thinking and reasoning and deteriorate analytical capabilities. This looks to be a big concern considering the goal of higher education to increase cognitive capacities, which might be undermined by excessive reliance on technology tools, particularly AI-based technologies (Abdaljaleel et al., 2024). While ChatGPT also provides several benefits for evaluation in higher education, there are a few major challenges that ChatGPT and other AI language models like it may provide (Cotton et al., 2023). One of the first and most common complaints about utilizing ChatGPT has been that it undermines the essay as an evaluation technique. Some professors are concerned that students may outsource their written tasks to ChatGPT, which can create decent content in seconds without activating a plagiarism detector. However, such

issues may emerge from instructors' difficulty in adjusting to the change in assessment techniques, as written assignments are typically blamed for being monotonous and useless in measuring students' learning. Education practitioners and policymakers are always accountable for handling the situation. When the issues are not addressed, inadequate teaching techniques may be exposed (Rudolph et al., 2023). Howell & Potgieter (2023) agree and conclude in their research that they have no choice but to work with the new technologies, maximizing their strengths and shortcomings to accomplish teaching, learning, and evaluation goals. According to Zhai (2022), AI systems can be impersonal and may be unable to engage pupils like a human instructor does. It might be difficult to keep students interested and motivated.

However, using external knowledge sources has obstacles, such as the necessity for effective retrieval techniques and the risk of injecting bias into the models. As a result, further study is needed to increase the efficacy of these techniques and address potential ethical problems when deploying large-scale language models in various applications (Wu et al., 2023). Zhai (2022) emphasizes that Education should prioritize boosting pupils' creativity and critical thinking over general abilities. More research is needed to determine whether AI can and cannot replace aspects of human intellect. Understanding the distinctions allows us to design learning goals for students properly.

The integration of AI technologies, particularly generative AI chatbots, is fundamentally transforming the academic landscape of higher education institutions globally. Chukwuere (2024) posits that as these institutions grapple with the intricacies of an increasingly technology-driven era, the prospect of AI chatbots in higher education presents a dichotomy of unparalleled opportunities and formidable challenges. The advent of sophisticated generative AI chatbots, exemplified by ChatGPT, has positioned higher education institutions at the vanguard of a technological renaissance. This revolution holds the potential to radically redefine conventional paradigms of teaching, learning, and research within academia.

2.6.   Ethical, social and behavioural impacts of using ChatGPT

The development and application of ChatGPT must adhere to ethical and legal considerations. One must guarantee that its use does not break ethical and legal standards, such as those governing fraud, invasion of privacy, discrimination, and other undesired reasons (Wu et al., 2023). While ChatGPT may assist students, scholars, and practitioners, important concerns such as ethical considerations, data protection, and prejudice must be properly addressed (Rasul et al., 2023). Because of its great efficiency and response quality, ChatGPT outperforms most other problem-solving tools. Furthermore, exploiting ChatGPT may lead to further social-ethical issues (for example, the generation of harmful material) if suitable mitigating mechanisms are not included (Wu et al., 2023). Some people have expressed ethical concerns regarding using AI in education, such as its ability to perpetuate prejudices and reinforce existing inequalities. These issues have created a demand for ethical principles and best practices for using ChatGPT in education (Zhai, 2022). As explained by Zhai (2022), concerns in AI systems include prejudice, which can be perpetuated by the data used for training. This can result in uneven and unjust outcomes for students, especially if the prejudice is based on criteria like ethnicity, gender, or socioeconomic background. Privacy: AI systems sometimes need to collect and process vast volumes of student information. This may create worries regarding student privacy and the security of the data. Lack of transparency: Certain AI systems are difficult to grasp and interpret, so instructors and students may struggle to understand how choices are made (Zhai, 2022).

The intersection of AI and education gives rise to a complex web of ethical considerations, including concerns surrounding data privacy, informed consent, and operational transparency. Educational institutions grapple with the moral imperative of safeguarding student information while implementing AI-driven initiatives. This ethical quandary necessitates obtaining explicit, informed consent from students and offering them the autonomy to engage with or opt out of AI-enhanced educational programs. Furthermore, fostering an environment of openness regarding the integration and application of AI technologies within academic settings is paramount. Such transparency is essential for cultivating trust among stakeholders and effectively addressing the myriad ethical issues that arise from the deployment of AI in education (Rane et al., 2023).

According to Su & Yang (2023), concerns about safety and ethics are also raised using ChatGPT in the classroom. First, there is a chance that students could be tricked or manipulated by technology. The model can potentially give students false information or lead them in the wrong direction if it fails to be properly monitored and supervised. Second, there's a chance that pupils' privacy will be violated by technology. Students' private information may be accessed without their knowledge or consent if the model is not properly secured. Third, there's a chance that some students will be the target of technology-based discrimination. The model may be used to allow unequal access to education if it was not trained on data that are representative of all students.

As with many technological advancements, the crux of the matter lies in our perceptions, interactions, and reactions to it. LLMs such as ChatGPT have ignited a spectrum of responses within the higher education community, ranging from enthusiastic discourse to apprehension. While a significant portion of the academic community recognizes and embraces the potential of AI-powered writing tools, others, more entrenched in traditional methodologies, find themselves grappling with the swift pace of change these technologies introduce. This dichotomy of perspectives underscores the complex landscape of AI adoption in academia (Zdravkova, et al., 2023).

According to Zarifhonarvar (2023), integrating AI into education requires careful evaluation of potential obstacles and ethical concerns while keeping the human element vital to learning. According to Zarifhonarvar (2023), there are several ways to look at the ChatGPT and how it affects economies worldwide, and each has something valuable to say. The most important topic is how these AI-powered services affect labour markets and forces. Additionally, ChatGPT may significantly impact market research analysts, professors, customer service representatives, and employees in specific finance-related industries. AI would impact financial jobs that require data analysis, such as market research analysts and personal financial counsellors. Autor (2022) addresses how technology affects wages and wage inequality. The author discusses four schools of thought on this topic: the education race, the task-polarization model, the automation race, and the era of AI uncertainty. The author identifies three areas of policy intervention: education and training, labour market institutions, and innovation policy. Potential policy interventions include improving workforce skills, revitalizing labour market institutions, and directly directing innovation to complement workforce capabilities. The author closes by arguing that legislative changes are required to balance the benefits of technological progress with shared prosperity.

According to Zarifhonarvar (2023), collaboration between humans and AI is a promising strategy for using ChatGPT in education. AI can supplement, rather than replace, human educators. AI can help instructors personalize learning experiences by tailoring information and exercises to specific student requirements and learning styles. Automating mundane chores,

like grading assignments, frees up educators' time for more meaningful interactions with students. Additionally, educators need training to integrate AI into their teaching approaches. Developing the abilities required to use AI to better education is critical. Balancing traditional teaching methods with AI-augmented learning experiences is crucial for providing a well-rounded education while leveraging AI-generated aid. ChatGPT opens a world of possibilities in education, transforming how students learn, and educators educate. Its features include personalized teaching, language learning, content development, accessibility, research aids, and administrative chores to enhance the educational experience.

According to Vargas-Murillo et al. (2023), the rapid advancement of technology has led authors to increasingly rely on AI tools like generative chatbots to complement their work. However, this trend raises ethical concerns, such as the potential for diminished creative thinking and compromised research integrity, especially when AI-generated content is based on imprecise prompts. While ChatGPT offers significant capabilities, it also poses challenges to the development of student's critical thinking skills, as they may depend on AI for answers rather than engaging deeply with educational material. Educators have expressed concerns about the implications of AI in academia, emphasizing the need for students to develop independent thought and originality. The rise of AI tools necessitates a balanced approach that considers both their benefits and the ethical dilemmas they introduce.

Furthermore, according to Zarifhonarvar (2023), his article examines strategies and techniques for detecting and managing academic misconduct related to AI-generated content. The author's study examines how ChatGPT improves students, instructors, and researchers' critical thinking skills. This study investigates how generative AI might enhance critical thinking through novel teaching strategies. This limitation poses a significant challenge in educational settings emphasizing nuanced understanding and critical thinking. ChatGPT produces responses by predicting the most likely next word or phrase, which may not reflect a deep comprehension of complex topics or the capacity to participate in meaningful discussions. Concerns about bias and fairness loom large. AI models like ChatGPT can perpetuate biases in training data, leading to biased research findings and worsening inequities in specific subjects or domains. Another potential problem is becoming overly reliant on ChatGPT and other AI tools. Overreliance on technology might hinder researchers' critical thinking and analytical skills, which are crucial for effective academic research.

3. Theoretical Framework

This chapter will examine the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). This model can help explain the factors influencing technology acceptance and use in various settings. This approach is especially useful for evaluating how students and educators accept and adapt to emerging technologies such as ChatGPT and how these technologies affect pedagogical techniques and educational dynamics. By basing our research on this well-established model, we hope to thoroughly examine LLMs' behavioural, ethical, and social implications.

3.1. Selection of theoretical framework

The main objective of our thesis is to evaluate LLMs like ChatGPT's influence on learning and assess its influence and impact on university students and their teachers in a learning context. The key concepts drawn from the research question and literature review are LLMs, ChatGPT, educational integration of AI, ethical considerations, student and teacher perspectives, and impact on learning. Relevant theories derived can be put forward as ChatGPT has been identified as a beneficial tool in higher education, with both potential advantages and limitations.

According to Putra et al. (2023), it has been discovered that students who rely too much on ChatGPT may suffer a decline in higher-order thinking skills. The Human-Centered AI framework is the primary theoretical framework for understanding ChatGPT in higher education. The theoretical and methodological grounds for adopting AI tools in higher education, such as ChatGPT, have been examined within the Human-Centered AI framework (Rezaev & Tregubova, 2023). In addition, a model has been created to predict the adoption and usage of ChatGPT among higher education students, with habit, performance expectancy, and hedonic motivation identified as predictors of behavioural intention (Strzelecki, 2023). In contrast, according to Su & Yang (2023), the theoretical framework for using generative AI in education, which is the Identify, Determine, Ensure, Evaluate (IDEE) framework, focuses on establishing intended goals, deciding the right amount of automation, guaranteeing ethical concerns, IDEE framework and assessing effectiveness in the context of educational AI, including the usage of ChatGPT in education. The IDEE framework for educative AI consists of four steps: 'I' for identifying desired outcomes and objectives, 'D' for determining the appropriate level of automation, the first 'E' for ensuring ethical considerations are met, and the second 'E' for evaluating the effectiveness of the application (Su & Yang, 2023).

In this study, we use the well-known "Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)" created by Venkatesh et al. (2012). UTAUT identifies seven indicators of technology usage and intention to use, including "Performance Expectancy", "Effort Expectancy", "Social Influence", "Facilitating Conditions", "Hedonic Motivation", "Price Value", and "Habit" (Strzelecki, 2023). The UTAUT2 is an expansion of the original UTAUT paradigm designed to comprehend technology adoption in consumer situations better. UTAUT2 adds three new constructs to the original model: Hedonic Motivation (HM), Price Value (PV), and Habit (HT), in addition to the original constructs of Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. This model describes user intentions to utilize an information system and their subsequent usage behaviour. The impact of

behavioural intention on technology usage differs significantly between UTAUT and UTAUT2. In UTAUT, behavioural intention had a direct beneficial influence on usage. However, in the consumer context (UTAUT2), experience with the target technology moderated this effect (Venkatesh et al., 2012).

The UTAUT2 model is widely used in empirical research to measure technological acceptance. UTAUT2 may outperform its predecessor regarding predictive capability (Or, 2023). UTAUT2 is suitable for conducting a qualitative study on students' and educators' ethical opinions about using LLMs like ChatGPT in university education. "Performance expectancy" comprises four factors geared towards employing ChatGPT "in studies". Similarly, according to UTAUT2, "Effort expectancy" has four components, "Social influence" has three, "Facilitating conditions" has four, and "Behavioural intention" has three. These variables were first introduced in the 2003 version of UTAUT. According to the UTAUT2 version from 2012, "Hedonic motivation" contains three elements and "Habit" has four (Strzelecki, 2023).

Here's how the UTAUT2 model (see Figure 1), as created by Venkatesh et al. (2012), will make our assessment effective:

1. **Performance Expectancy (PE)**: Venkatesh et al. (2012) found that performance expectancy predicts behavioural intention, consistent with the original model. The notion stays consistent in subsequent empirical research using the Unified Theory of Acceptance and Use of Technology 2 (Or, 2023). PE is described as users' views about their potential to maximize performance in various tasks and jobs using the benefits of a specific technology system. In this work, the term "system" refers to the application of AI, especially ChatGPT, in learning activities (Habibi et al., 2023).

2. **Effort Expectancy (EE):** Work expectation refers to the degree of work required to run a particular technology. UTAUT's original variable is effort expectancy. This evaluation uses effort expectation to assess users' perceptions of the application's ease of use (Meyliana et al., 2019).

3. **Social Influence (SI):** According to Meyliana et al. (2019), social influence relates to the extent to which close friends and family believe we should utilize technology. UTAUT includes social impact as an original variable. This evaluation assesses social impact by measuring the acceptance of an application among those affected by others.
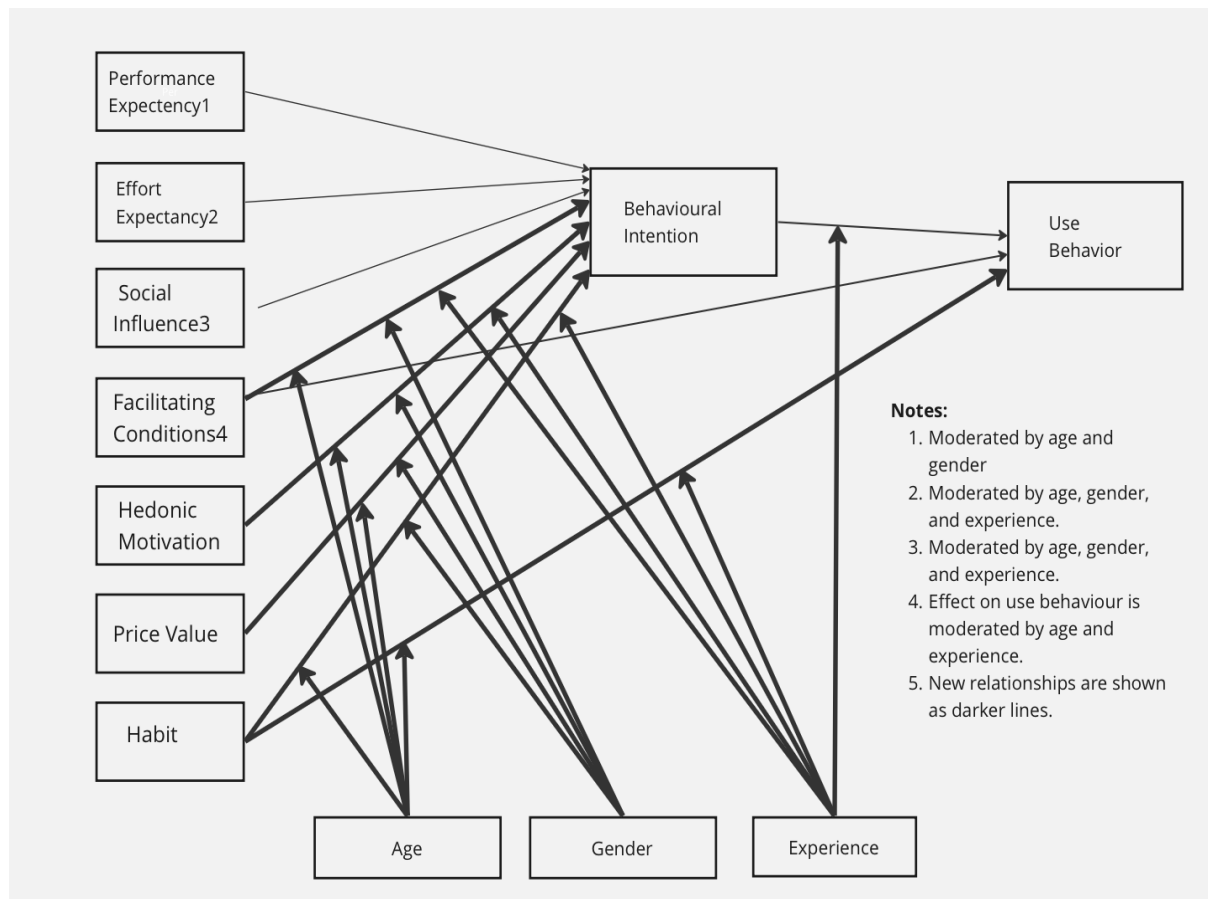
Figure 1. Unified theory of acceptance and use of technology (UTAUT2) Model (Venkatesh et al., 2012: 160)

Note. Adapted from "The influence of learning value on learning management system use: An extension of UTAUT2" by Venkatesh et al., 2012, Scientific Figure on ResearchGate. Retrieved from https://www.researchgate.net/figure/Unified-theory-of-acceptance-and-use-of-technology-UTAUT2-Model-Venkatesh-et-al_fig2_322926440

4. **Facilitating Conditions (FC):** Facilitating conditions refer to the user's sense of access to and support for existing technology. It will give external resources to improve behaviour performance (Meyliana et al., 2019). The UTAUT2 paradigm promoted FC to predict users' desire to utilize certain technologies and their actual use (Habibi et al., 2023).

5. **Hedonic Motivation (HM):** Hedonic motivation refers to the pleasure or satisfaction of employing technology. This evaluation will assess hedonic motivation by measuring how many individuals find the application enjoyable. There are three aspects of hedonic motivation. The first concept is fun, which refers to the pleasure of utilizing technology. The second factor is enjoyment, which refers to the level of pleasure experienced when utilizing technology. The latter refers to the system's ability to provide entertainment to users (Meyliana et al., 2019).

6. **Price Value (PV):** According to Meyliana et al. (2019), the pricing value of technology is determined by comparing its advantages to the costs or fees associated with its use. This assessment will assess the pricing worth of an application based on how many users believe the price is justified by its convenience.

7. **Habit (HT):** Habit refers to a routine or habit. In information systems, "habit" refers to users' automatic usage of systems after learning them. Addictiveness is the amount of addiction gained by users of the system (Meyliana et al., 2019).

The above constructs help us analyze how various aspects influence educators' and students' decisions to use ChatGPT.

3.2. How UTAUT2 used in our thesis

In this study, we used UTAUT2 and the research questions to help us create questions for interviews and surveys. We use it as a framework for organizing and evaluating information, permitting us to see trends in how individuals begin to use and interact with technology. Considering ethical behavioural and social concerns, we assess how broadly students and teachers embrace LLMs like ChatGPT. UTAUT2 is a theoretical framework that includes elements that can predict user acceptance and usage based on performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit.

The core purpose of UTAUT2 is to determine user behaviour regarding technology adoption. It looks at users' intended and actual technology use behaviours, which are important to comprehend how ChatGPT might be integrated into educational contexts.

Although UTAUT2 is normally used in consumer contexts, it can be modified to investigate how technology is accepted in educational settings by emphasizing how teachers and students embrace and incorporate new technologies into their teaching methods.

For this study of LLMs in University education, the UTAUT2 framework was adapted to focus on the following:

PE: What perceptions do teachers and students have of how effectively LLMs have enhanced their academic performance?

EE: What level of simplicity is it perceived to use LLMs for both educating and learning?

SI: How do institutional standards and views from peers affect the adoption of LLMs such as ChatGPT?

FC: What infrastructure, resources, and support from institutions are available to facilitate using LLMs?

HM: Do users like students and teachers find interacting with LLMs satisfying and enjoyable?

PV: How do the perceived benefits of using LLMs such as ChatGPT compare against any costs (not just financially, but also time, effort, etc.)?

HT: How far has the usage of LLMs deeply rooted itself into users' daily routines in educational settings?

3.2.1. Interview Questions using the UTAUT2 framework.

The interview questions in this thesis are mostly created with experiences, attitudes, and perceptions of LLMs in mind. This is how the interview questions matched using the theoretical framework:

PE: "Can you describe how you believe LLMs like ChatGPT enhance or could enhance learning outcomes in your courses?"

EE: "What has been your experience regarding the ease of use of LLMs in educational activities?"

SI: "How do the opinions of your colleagues and the broader academic community influence your decision to use or not use LLMs?"

FC: "What kinds of support and resources does your institution provide for using technologies like LLMs?"

HM: "Do you find any personal satisfaction or enjoyment from using LLMs in your teaching or learning?"

PV: "Do you feel the benefits of using LLMs in education justify any costs associated with their use?"

HT: "How frequently do you integrate LLMs into your regular teaching or learning routines?"

According to Venkatesh et al. (2023), among the most frequently cited theories is the UTAUT, which was first introduced approximately two decades ago (Venkatesh et al., 2003). Although UTAUT is a general framework applicable to various technology adoption contexts, contextualized versions have been developed, such as UTAUT2, which focuses on consumer adoption of technologies (Venkatesh et al., 2012). Expanding on UTAUT, numerous studies have proposed research agendas for technology adoption more broadly (Blut et al., 2022; Venkatesh et al., 2016) and for specific technologies, such as AI (Venkatesh, 2022).

3.2.2. Survey Questions using the UTAUT2 framework.

This study uses a qualitative approach for analyzing survey data concerning the use of Large To analyze survey data about the use of LLMs like ChatGPT in academic settings; this study uses a qualitative method. Rather than focusing on quantifying replies, the goal is to capture rich, descriptive insights. Open-ended responses, which enable respondents to describe their thoughts, feelings, and experiences, can be encouraged by structuring the survey questions. Here's how you could modify the survey questions to make them consistent with UTAUT2.

PE: "Please describe how you believe LLMs like ChatGPT could enhance or have enhanced learning and teaching outcomes in your experience. What specific aspects of your academic work have they impacted?"

EE: "Could you elaborate on your experiences with the ease or difficulty of integrating LLMs into your educational activities? What challenges or facilitators have you encountered?"

SI: "Can you discuss how the opinions of your colleagues or the institutional culture have influenced your views or usage of LLMs? Are there any notable endorsements or criticisms within your academic community?"

FC: "What support and resources does your institution provide for using technologies like LLMs? How have these conditions affected your ability or willingness to use LLMs?"

HM: "What has been your experience regarding the enjoyment or satisfaction of using LLMs? Are there elements of using these technologies that you find particularly engaging or discouraging?"

PV: "Please discuss the perceived benefits versus the costs (such as time, effort, or financial) associated with using LLMs. Do you believe the trade-offs are justified?"

HT: "How often do you use LLMs in your academic routines? Can you describe how LLMs have become part of your or your peers' educational practices?"

Using the UTAUT2 model to integrate data collection methods into its constructs helps to ensure that the effects of LLMs on higher education are thoroughly examined. This method makes it easier to comprehend the variables affecting the acceptance and application of LLMs in higher education. It adds richer context and a variety of viewpoints to the data. Painting a complete picture of the dynamics influencing the adoption of LLM technology in educational settings is possible in large part by this qualitative data.

4. Methodology

This chapter describes the research methodology used to explore the effects of LLMs such as ChatGPT on traditional higher education dynamics from an ethical, behavioural, and social perspective. This study uses a qualitative research approach and the UTAUT2 as its theoretical framework to examine the diverse effects of LLMs in academic contexts.

To generate thorough qualitative data, this study uses two principal data-gathering methods: semi-structured interviews and online surveys. The interviews were performed with a carefully selected group of instructors and students, and they were intended to explore deeply personal experiences, perceptions, and observable social dynamics influenced using ChatGPT. The online surveys use a mix of open and closed-ended questions, and they are widely distributed throughout the academic community. The following sections first define the methodological tradition and approach. Next, they describe the data collection method, including participant selection. Then, they discuss the data analysis, validity, reliability, and the thesis' ethical implications.

4.1.   Methodological Tradition

In the Information Systems (IS) study, methodological tradition refers to the traditional, established methodologies and practices that guide research and inquiry. These traditions include the concepts, tactics, and techniques used to investigate, understand, and solve information systems challenges. As illustrated below, methodological traditions in Information systems are broadly classified into different kinds.

Four paradigms in IS research are postpositivism (positivism), Constructivism (Interpretivism), Transformative (Critical research) and pragmatism (Action research). Postpositivists believe in a deterministic worldview, where causes likely influence consequences or outcomes. Postpositivists study problems that include identifying and assessing reasons that impact results, like experiments. The reductionistic approach uses discrete variables to examine a small collection of ideas, such as hypotheses and research questions. Knowledge is gained via diligent observation and measurement of an objective reality—developing numerical metrics to evaluate individual behaviour. Testing and refining laws and hypotheses to gain a better understanding of the universe, Scientific techniques developing a theory, collecting evidence to support or disprove it, and then revising and testing further (Creswell & Creswell, 2018).

According to social constructivists, people strive to comprehend their surroundings. Individuals create subjective interpretations of their experiences, focusing on specific items or things. The researcher focuses on the diversity of meanings rather than categorizing them. The research primarily focuses on participants' perspectives on the situation under investigation. Individuals want to comprehend their surroundings, including things and objects. They create subjective meanings based on their experiences, which can be diverse and multifaceted (Creswell & Creswell, 2018).

The transformational worldview emphasizes studying marginalized people and their experiences. Diverse groups are particularly interested in how oppressors have limited their lives and the techniques they employ to combat and overcome these limits. The research examines injustices caused by gender, race, ethnicity, disability, sexual orientation, and

socioeconomic status, resulting in unequal power interactions. Transformative worldview research connects political and social action to addressing disparities. It employs a programme theory to understand how programmes function and why oppression, dominance, and power dynamics persist (Creswell & Creswell, 2018).

Pragmatism is not tied to any philosophical or real-world system. In mixed methods research, researchers use a combination of quantitative and qualitative assumptions. Individual researchers have freedom of choice, allowing them to select the most appropriate study methodologies, strategies, and processes for their needs and objectives. Pragmatists do not consider the world as an absolute unit. Mixed methods researchers use many methods for data collection and analysis rather than relying only on one (e.g., quantitative or qualitative). Truth is what works now. It does not distinguish between reality outside or within the mind (Creswell & Creswell, 2018).

Constructivism learning theory promotes self-directed and active learning, whereas traditional learning focuses on the passive reception of academic knowledge. Constructivism is a theory based on watching and rigorously examining how people acquire information, drawing influence from disciplines such as philosophy, psychology, sociology, and pedagogy (Rasul et al., 2023). A method that fosters trustworthy connections with students through student-centred teaching and evaluations for and as learning, rather than just assessments of learning and the notion of constructive alignment required to guarantee that learning objectives, learning, teaching, and assessments are all constructively aligned (Rudolph et al., 2023). The thesis is a forward-looking study exploring the impact of ChatGPT on the future of higher education. Constructive theory aligns with our thesis goals and provides a framework for illustrating how technology can be used to foster active, collaborative, and personalized learning in higher education.

By studying the four paradigms within the information system, it is determined that this master's thesis is based on the constructivist paradigm. As mentioned in the introduction chapter, this thesis aims to assess the impact of LLMs such as ChatGPT on university students and instructors. The research question highlights these technologies' ethical, behavioural, and social aspects. In IS research, the constructivism paradigm emphasizes understanding the context and meanings of information systems in specific settings, typically through qualitative methods like interviews.

4.2. Methodological Approach

In IS research, a methodological approach refers to a researcher's systematic plan or procedure for conducting a study. This includes the entire research design, data collection methodologies, and analytical approaches used to investigate, comprehend, and draw conclusions on a specific IS phenomenon or problem. It is also influenced by the research questions, objectives, nature of the phenomenon under investigation, and the theoretical and philosophical foundations of the researcher's viewpoint. Furthermore, the research design establishes the structure of the inquiry and outlines the steps required to answer the research question. It entails deciding between core approaches like qualitative, quantitative, or mixed methods research.

According to Creswell and Creswell (2018), the researcher chooses whether to perform a qualitative, quantitative, or mixed-methods study. Additionally, the inquirer selects a study type from these options. Research designs, including qualitative (e.g., Ethnographies), quantitative (e.g., experiments), and mixed methodologies (e.g., Explanatory sequential), guide study operations.

Creswell (2017) defines it as a tool for studying social and cultural issues. Qualitative researchers analyze circumstances in their natural surroundings to explain occurrences based on the meanings individuals assign to them (Crang and Cook, 2007). Qualitative research uses interviews, observations, documents, and focus groups to analyze and explain social phenomena (Kaplan and Maxwell, 2005). Kaplan and Maxwell (2005) recommend explaining real events and processes that resulted in specific results. The qualitative method involves a constructivist worldview, ethnographic design, and behaviour observation (Creswell and Creswell, 2018). Principles of ethnography in IS research (IS-related ethnography) include natural settings, holistic approach, descriptive understanding, and participants' perspectives.

In IS research, ethnography is a qualitative method that involves observing people in their natural environment. Ethnography is useful in IS research because it allows for in-depth investigations, immersion, insights into daily work situations, knowledge of technology in context, characterizing people's behaviours, and comprehending human behaviour. Data Collection in Ethnography, where data sources include observations (participant or non-participant) and note-taking, interviews, documents, and Photos/Videos (Randell and Rouncefield, 2014).

In this thesis, a qualitative methodological approach was adopted that governs how research questions are created, what data is collected, and how that data is analyzed to contribute to knowledge in the field of IS. Phenomenology is chosen as a qualitative methodological technique for IS study. Phenomenology is concerned with understanding and interpreting people's experiences when interacting with information systems.

4.3. Data Collection Methods

Qualitative methods demonstrate a different approach to scholarly inquiry than quantitative research methods. Although the processes are similar, qualitative methods rely on text and image data, have unique steps in data analysis, and draw on diverse designs. Writing a method section for a proposal or study for qualitative research partly requires educating readers as to the intent of qualitative research, mentioning specific designs, carefully reflecting on the role the researcher plays in the study, drawing from an ever-expanding list of types of data sources, using specific protocols for recording data, analyzing the information through multiple steps of analysis, and mentioning approaches for documenting the methodological integrity or accuracy—or validity—of the data collected (Creswell & Creswell, 2018).

Within the field of information systems research, phenomenology can be employed to explore how people perceive and interpret information systems in their private or work environments. This includes their perceptions, sentiments, and ideas about an IS. Observations, in-depth interviews, and study of individual experiences are frequently included in phenomenological research in IS. This study aims to put participants' perspectives before the authors' assumptions to extract the essence of information systems-related experiences.

This study used two data collection methods: interviews and online surveys. Interviews are important for gathering in-depth, rich data from participants. Online surveys have become popular data collection methods, particularly in studies with geographically dispersed participants. The type of survey questions defined the study approach used. Qualitative data is often open-ended, with no predetermined responses, whereas quantitative data typically includes closed-ended responses, such as those found on questionnaires or psychological tests.

Interviews and online surveys are complementary data collection techniques in research investigations, each providing various benefits regarding depth of exploration, participant engagement, efficiency, and scalability. Choosing between interviews and online surveys is determined by the research objectives, methodological factors, and target population characteristics. We selected participants, both students and teachers, mostly from our higher education institute network. We interviewed eight participants (see the details in the table below). As for the online survey, there were fifteen participants.

The participants involved in the data collection process belonged to diverse demographic backgrounds. The data was gathered through an online survey targeting university-level teachers and students. The survey tool utilized was Google Forms, which consisted of 19 questions in total, 7 of which were open-ended and the remaining close-ended. Google Forms was chosen for its ease of use and accessibility.

The survey aimed to collect perceptions, feedback, and experiences from students and faculty regarding using LLMs like ChatGPT for academic purposes and daily queries related to their subjects. The total number of respondents who participated in the survey was 15, comprising 7 students and 8 faculty members from different demographics and fields of specialization, as shown in a chart in Figure 3.

The questionnaire was designed to advance our understanding of the effects of LLMs in academic environments, particularly concerning academic integrity, instructional design, accessibility, and the quality of the educational process. Participants were invited to participate in the online survey through various social media platforms like WhatsApp, Facebook, and email. Responses were accepted from April 24, 2024, to May 3, 2024, and all responses gathered during that period were considered for analysis. The collected data underwent a review process, where blank responses were removed, and unclear or irrelevant data was cleaned up, preparing it for thematic analysis to generate codes and themes.

Table 1. Role of participants, interview date, and duration

Participants	Role	Interview Date	Interview Duration
Participant A	Teacher	May 2, 2024	38 minutes
Participant B	Teacher	May 2, 2024	37 minutes
Participant C	Student	April 19, 2024	44 minutes
Participant D	Teacher	April 22, 2024	34 minutes
Participant E	Teacher	April 29, 2024	42 minutes
Participant F	Student	April 6, 2024	53 Minutes
Participant G	Student	May 2, 2024	30 minutes
Participant H	Student	March 22, 2024	34 minutes

4.4.   Methods of Data Analysis

Data analysis is an ongoing process during research. It involves analyzing participant information, and researchers typically employ general analysis steps and those steps found within a specific design. More general steps include organizing and preparing the data; an initial reading through the information; coding the data; developing from the codes a description and thematic analysis; using computer programs; representing the findings in tables, graphs, and figures; and interpreting the findings. These interpretations involve stating lessons learned, comparing the findings with past literature and theory, raising questions, offering personal perspectives, stating limitations, and advancing an agenda for reform. The project should also contain a section on the expected outcomes of the study. Finally, an additional important step in planning a proposal is to mention the strategies that will be used to validate the accuracy of the findings and demonstrate the reliability of codes and themes (Creswell & Creswell, 2018).

In this project, data will be gathered through interviews and online surveys and then reviewed using a systematic approach to organizing, evaluating, and obtaining relevant insights from the data. Interviews and online surveys provide qualitative data, necessitating appropriate analytical methods to address research questions and objectives effectively. Creswell & Creswell (2018) state that various steps are involved in qualitative research interpretation, including a summary of the overall results, comparing the results with prior research, a discussion of one's interpretation of the findings, and a statement of limitations and future study.

Data was collected via interviews and online surveys; applying thematic analysis is the best technique. Braun and Clarke (2006) described thematic analysis as a technique for detecting, interpreting, and reporting patterns or themes in data. It minimally organizes and defines your data set in detail. The authors also advised that thematic analysis be viewed as a fundamental tool for qualitative analysis. Several steps must be followed in thematic analysis (Familiarizing

oneself with the data, generating codes, searching for themes, reviewing themes, reviewing themes, defining and naming themes, and producing a report). The steps to do the data analysis of an online survey may be a bit different (data cleaning, conducting descriptive analysis, visualizing the survey data, conducting inferential analysis, exploratory data analysis, and interpretation and conclusion). In any data analysis process, while each step is crucial, the interpretation of the results ultimately determines the significance and relevance of the findings.

4.5.   Reliability and Validity

In qualitative research, such as phenomenology, validity is frequently used to describe how exactly the study reflects the participants' experiences and reality. Because phenomenological studies strive to comprehend the essence of lived experiences, such as those of students and instructors, validity is more concerned with the authenticity and accuracy of the findings than statistical generalizability. On the other hand, reliability in qualitative research, including phenomenology, refers to the consistency of the researcher's technique and the degree to which the study may be duplicated with identical results. In phenomenology, as in this study, where LLMs such as ChatGPT are used to describe a phenomenon, dependability is less about repeating precise findings and more about ensuring transparency and consistency in the research process.

Creswell (2007) indicated that he considered qualitative research to be an attempt to assess the "accuracy" of the findings, as best described by the researcher and the participants. This view also suggests that any research report represents the author. He also views validation as a distinct strength of qualitative research in that the account made through extensive time spent in the field, the detailed thick description, and the closeness of the researcher to participants in the study all add to the value or accuracy of a study.

4.6.   Ethical Considerations

This study carefully addresses the ethical considerations surrounding data collection via interviews and online questionnaires to ensure conformity to research ethics and best practices. To that purpose, a rigorously designed informed consent form was created, explicitly stating the study's objectives, the nature of participation, and the measures in place to ensure participant confidentiality and anonymity.

Before participation, each respondent was properly briefed on the study, either verbally or in writing, emphasizing their right to fully understand the research before deciding to participate. Participants were then requested to express their consent by signing the informed consent form, which followed the idea of voluntary participation, as underlined by Creswell and Creswell (2018). This method promotes the ethical requirement that consent should be freely granted. This approach promotes the ethical principle that consent should be freely granted and withdrawn at any moment without penalty.

Participants were further assured that their answers would be handled with the highest confidentiality and anonymity, underscoring the importance of ethical integrity. Their answers are not saved with any personal information, and all information is given in aggregate form to exclude any possibility of participant identification.

It was clear to all participants that their participation in the study was entirely voluntary to prevent any participant from feeling under duress. The integrity of the data-gathering procedure and the participants' trust depend heavily on this non-coercive technique. In this thesis process ethical norms were followed that safeguard participant welfare and autonomy by clearly emphasizing that participation is voluntary and that they can withdraw from the study at any moment without facing any repercussions.

5. Empirical Findings

This chapter presents the findings of a detailed analysis of interviews and online surveys conducted to investigate the adoption and use of LLMs such as ChatGPT in higher education, with a primary focus on the behavioral, social, and ethical factors that influence the incorporation of advanced AI technologies in academic contexts.

This study uses a structured analysis of data acquired through online questionnaires and semi-structured interviews to examine numerous essential aspects of educational practice and ethics. We discovered forty-nine codes and refined eighteen categories, resulting in six themes demonstrating the impact of LLMs such as ChatGPT in higher education contexts. These themes represent the main areas of interest and concern identified by academic stakeholders.

1. Academic Integrity
2. Accessibility and inclusion
3. Teaching Methodologies
4. Student-teacher relationship
5. Ethical considerations and solutions
6. Future Perspectives

5.1. Empirical Findings of Qualitative Data - Interview

Participants' personal use of LLMs:

Each interview began with inquiries on the participants' backgrounds and expertise in LLMs, such as ChatGPT. The participants' personal usage of educational environments varies in intensity, ranging from minimal to substantial.

> *"Well, I've used it a few times, but typically, I would avoid using it for educational purposes because, well, when we write some free text, it's more like plagiarism or copying. But sometimes, if it's something in the computer field and engineering, I have asked it a few times to provide some solutions to my questions. But, overall, I just try to see how it works. But then I abandoned it because I heard it's based on Google. So, I just search on Google most of the time. That's in an educational setting. I mostly don't use it. But my sister told me it could be used to write motivational letters for job applications. I haven't tried it yet, but it sounds fun."* *(Participant H)*

Participant H has repeatedly used the program for specialized engineering and computer-related questions. Still, the participant avoids using it for educational reasons due to concerns about plagiarism and uses Google for most searches. The participant also added that their sister recommended the tool for creating motivational letters for job applications, something intrigued by but has yet to use.

> *"From a teaching standpoint, I utilize LLM, a ChatGPT, or co-pilot whenever I need to create questions or problems to solve, followed by double-checking and confirming that the results and the questions are correct. Sometimes, LLMs are*

biased, and they might produce erroneous results, so to say, or erroneous questions. So, in that sense, I use them to some extent" (Participant A)

Participant A generates educational information using LLM tools but always double-checks the outcomes to ensure there are no errors. The respondent finds these techniques valuable while acknowledging the importance of thorough review.

"And then I've also started using Claude, which is another LLM lately. But I would say ChatGPT has been one of the tools I've been using.... I use only the free version, so I don't use any sort of paid version of ChatGPT. Although the Copilot we get from the university, we get sort of this advanced version, which is supposed to be better. In my experience, to be honest, it doesn't really live up to the expectations. Even though ChatGPT is free, I still think it's better for the type of work I use compared to the Copilot, which is, again, more than the free version." (Participant B)

Participant B preferred the free version of ChatGPT to the advanced version of CoPilot given by the university. Although it is free, the respondent found ChatGPT to be more useful for their purposes.

"Regarding LLM, I think I will use not only ChatGPT as an example. There is another application called CoPilot. I think it's from either Google or Microsoft. I can't remember. Looking at how the apps have been built, I think they benefit students, not just students alone but even the school. For instance, using the ChatGPT is not all about just writing the exams and all that. It's also about doing research. One of the advantages it offers is that it helps you save time. Instead of going through multiple kinds of literature or books, ChatGPT can summarize things you might not have been able to read about in a short while. So, I think it's a welcome development in the education sector setting." (Participant C)

According to Participant C, ChatGPT and Copilot are useful for research and saving time in educational contexts. The respondent likes the tool's capacity to generate concise summaries of substantial literature.

5.1.1. Academic Integrity

We then asked each participant to discuss how they felt the usage of LLMs by students affected the conventional ideas of academic integrity. Additionally, they were asked to give instances of how LLMs may be challenging in academic assessments.

"I think that with regard to this integrity, basically, we have done it. I did research last year with bachelor students from the Department of Informatics. There, there were surveys and interviews. One of the themes or topics we identified was academic integrity. The respondents in our research admitted that ChatGPT can create academic dishonesty and cheating if it's not properly monitored and controlled. Then, what does this mean, how do you monitor it, and how do you control it? Teachers can be creative with some pedagogical interventions, but I believe this can be regulated or addressed at a higher level in a university context. Universities should guarantee that these tools are used ethically and responsibly.

So, the positive things or the benefits should outweigh the risks in that sense." (Participant A)

Participant A emphasizes the risk of academic dishonesty with ChatGPT if not properly monitored. The participant proposes that universities regulate their use to ensure ethical and responsible use while utilizing inventive instructional approaches.

"*Alright, so when it comes to students and integrity, it is a really challenging issue, even if they would argue that we have tools to identify whether an article, for example, is written by a robot. However, in my opinion, it's not very practical. So, I believe we may not be able to conduct a thorough investigation regarding integrity. As everyone writes differently and under different situations, we would most likely have to take each student's word for it. For example, when someone turns in a project or piece of literature, you can't truly say that they didn't put any effort into it.*" (Participant C)

Participant C is skeptical about technologies for detecting AI-generated content and emphasizes the difficulty of validating academic honesty. Further, the respondent believes it is difficult to accurately measure the effort kids put into their work, implying a reliance on trust.
Regarding academic integrity, teachers must also follow clear guidelines when using LLMs to ensure that these tools improve educational outcomes rather than replace the crucial human elements of instruction.

"*It's a very powerful tool. And you know, people have it in their hands. And it's really difficult to say, you know, you have it, but don't use it. It just doesn't work. However, in order to not undermine the integrity, I think we need to provide some guidelines. So that, and I guess not only guidelines for students but even for us teachers, like on what grounds, how can we use it? For example, if I'm writing a scientific article, I don't just use ChatGPT to create content; I put it there and then send it. But I might use it, as I say, for brainstorming. [....] Maybe students don't really understand the seriousness of this. So, we need to give more concrete guidelines, what they can use it for, and what they cannot use it for.*" (Participant B)

Participant B emphasizes the importance of explicit standards for using ChatGPT to ensure academic integrity. The participant proposes explicit standards governing how students and teachers should use the technology responsibly, particularly for brainstorming rather than content creation.

According to the data collected, participants believe using LLMs to develop instructional materials and assessments must ensure academic integrity. Teachers should ensure that the content created by LLMs is correct and relevant to the course objectives. The principal ethical issue for students is academic dishonesty. Using LLMs to complete assignments, write papers, or do homework without proper attribution may be considered cheating.

"*[....] regarding the ethical terms that you said, as a teacher, maybe the ethical considerations are not that sensitive as a student because the student should submit assignments, but we as a teacher more practically use AI in terms of helping us with actually doing our research. So, in that term, the ethical considerations may not be that important compared to the student's level when*

using it. But still, for example, a few days ago, I wanted to submit a paper to a journal, and the first question that the journal editorial member asked us in the system was, have you used AI in any way to write your paper or to help you structure your paper, for example? And I had to explain exactly in what ways I have used it. So, even if you are a teacher at the university level, you still need to meet the ethical considerations in using AI and clarify to what extent you have used it." (Participant D)

Participant D highlights the different ethical considerations teachers and students must take when employing AI. The participant emphasized that lecturers must still declare AI use in academic submissions to promote transparency and ethical standards.

"There are two sides to this. One is the bad side and the risk that students use this to do home exams and stuff like that. And so, that is one thing that we are looking out for. There are also opportunities to submit a text that we think may be generated by a LLM and let the LLM decide whether there is a probability that this is probably not a genuine text but a LLM. So, we can use the... It's a two-sided weapon, so to speak." (Participant E)

Participant E highlights the dual nature of AI tools, noting the risks of academic dishonesty and the potential to use AI to detect AI-generated content. The participant sees AI as a challenge and a tool for maintaining academic integrity.

Personal integrity is just as important as following institutional policies. Students should commit to using LLMs to truly advance their learning, refrain from learning shortcuts, and respect the value of academic studies.

"I'm a person who put integrity above everything. So, if I get inspired by some words or something in the ChatGPT, I will not. Obviously, I cannot mention ChatGPT, but if we talk about academics, I will try to find academic journals or books. Everything that I can say is that I can use, this is academic, is like that. And then it's supposed to be like that because you need to respect the institution." (Participant F)

Participant F prioritizes integrity and, if inspired by ChatGPT, ensures that academic sources are correctly found and cited, emphasizing respect for academic standards and institutional integrity.

5.1.2. Accessibility and Inclusion

Participants were asked for their thoughts on how LLMs affect the accessibility of educational resources for students with varied needs and backgrounds. They were also questioned about whether they believe LLMs can level the playing field for students facing barriers or if they increase existing inequities.

"So, that's definitely every technology that has the potential to create a digital divide. Of course, there is no exclusion with LLMs as well. With the chat GPT or whatever LLM applications you have, they will definitely have their shortcomings in this direction, which can impact. Of course, it's their business model, I mean, that they offer something for free, and then the most accurate predictions or

models or answers are under the paywall. This is a kind of unavoidable barrier, which is within, is, of course, a characteristic of LLMs as well." (Participant A)

Participant A analyses the digital divide caused by LLMs like ChatGPT, highlighting the influence of business models that provide limited free services while keeping the most accurate results behind a paywall. They see this paywall as an intrinsic barrier to LLMs.

"Some, some, they get more information, good data, and so on. Yes, it does lead to inequality. If you don't have that much capacity to pay, obviously, it is creating inequality." (Participant G)

Participant G raised an important point: "Some people receive more information, better data, and so on. Yes, it leads to inequity. If you don't have the means to pay, it causes inequity." The gap in access to information and quality data based on financial capability was clear. Those who could afford to pay for better resources inevitably had an edge, increasing inequality.

"Well, that's a very interesting question. I mean, already, I have no access to this ChatGPT 4, the 4 series. But I understand that there are quite a lot of differences. One of the big differences is the possibility of getting real references to current material, not only material before the cutoff date, which was, I think, 2021, something like that, for the 3.5 model. So, it's really old stuff that your answers are based on rather old stuff. So, that is definitely a source of inequality. In this course, for instance, we have, I mean, there are a few totally free tools, but most of the tools, you only get to a one or two-week trial, or you have a very limited set of functionality in the tool to get the full functionality you need to pay [...] But for students, students generally don't have much money, but some students have lots of money, and they would be able to pay for premium services here with AI." (Participant E)

Participant E saw a definite divide between the free and paid versions. There are a few totally free tools, but for most of the tools, users only get a one—or two-week trial, or the tool has a very limited set of functionalities, and to get the full functionality, you need to pay. This scenario was especially difficult for students because, in general, students don't have much money, and they usually cannot pay for premium AI services such as tools like LLMs.

"I think as long as we still have the old method of sourcing for information, that is time to go through articles and publications. I don't believe the edge would be too much because, at the end of the day, the only advantage, for instance, if Participant A doesn't have access to it, the only advantage for Participant B, who has access to it, would probably be the time it takes them to get the information. Probably the view, maybe the angle, an answer or a response might be suggested to them because, at the end of the day, I think the trajectory does not generate information about itself. It still goes through different documents and different sources to get this information, especially the paid version." (Participant C)

Some participants discussed the issue globally by comparing the geographical differences between a specific country's level of development and that of a specific country.

"It depends on geography, the speed-up of the internet, and then the information infrastructure there. I mean, in each country. That's why, as I mentioned before,

it depends on which angle, if we talk about social welfare or maybe countries that already established with a good economic and financial, already established and stable financial as well. So, the infrastructure should be spread out all over the country. So it should be that there is a gap." (Participant F)

There is also a view where a participant recommended a set of skills that users who may not afford a paid version of these tools can use to get the utmost benefits.

"I would say that that's not the case for generative AI because, at least in the free version, ChatGPT 3.5, all students with all backgrounds can benefit from it. So, there are no worries regarding the accessibility. The only thing is that they need skills in order to benefit the best from AI. [...] So, you need a kind of skill to know how to deal with it and start communicating with AI." (Participant D)

However, Participant D had a different take on generative AI's accessibility. He argued that this is not the case because even in its free form, such as ChatGPT 3.5, students from all backgrounds may profit from it, so there are no concerns about accessibility.

5.1.3. Teaching Methodologies

Participants were asked about the influence of integrating LLMs in the curriculum on teacher-student interactions. Furthermore, the authors requested they discuss the ethical, behavioural, and social implications of adopting LLMs into teaching and learning processes.

"Well, there should always be, and these tools are, these are innovative tools, definitely. However, we need an innovative pedagogical strategy that is acceptable to students, does not compromise the quality, and meets the learning objectives in each course regarding teaching. So, LLMs, for instance, can definitely be used for creating assignments, such as essay assignments. But of course, there must be clear approaches. From my perspective, I have changed many assignment descriptions in the courses I am involved in because we know students will use the LLMs. However, there can be different approaches and different strategies. [...] as long as it is used responsibly and as a piece of technology, it can provide added value and contribute to better and more effective education. But it's up to the universities, it's up to the faculties, and teachers, to gradually transform the traditional teaching and evaluation methods, and introduce this state of technology at a reasonable time, in an agile way." (Participant A)

Participant A emphasized the importance of innovative and adaptable tactics for incorporating new technological tools into education: There should always be, and these technologies are undoubtedly innovative. However, we need an innovative technique, a pedagogical strategy, that is acceptable to students while maintaining quality and meeting the learning objectives in each course when it comes to teaching.

"Well, essentially, yes, we are adding one more parameter to the interaction. So before, it was just the student with the teacher. Now, we're having the tool. I mean, it's there, now it's present. So, we have to acknowledge that the tool is there. So, we need to have a dialogue with the students through some frameworks and guidelines on how we really use the tool and how that impacts each other's work.

The more we work on this kind of joint expectation and communications framework, the better we will address the ethical challenges that could arise. Of course, we can't pretend that all the ethical aspects will be fixed. That's a problem. And it's not going to be easy to do." (Participant B)

Participant B emphasized the changing dynamics of educational interactions by introducing new tools: This participant says, previously, it was just the student and the teacher; today, we have the tool. So, we must acknowledge the presence of the tool. As a result, we must engage students in a discourse about how we use technology and how it affects each other's work, using frameworks and guidelines. The more we work on shared expectations and a communication structure, the better we can address potential ethical difficulties. Obviously, we can't claim that all ethical aspects will be fixed. That's a problem. And it's not going to be easy to do.

While positive sentiments exist on this issue, as seen in the instances above, participants also consider the downsides of introducing LLMs into curricula.

"I think it might be a bad idea because, with the introduction of different web platforms that allow you to access classes online, we've seen fewer interactions between the teachers and the students. So, now incorporating LLMs into the curriculum and trying to make use of the disadvantages, I think, would further create a distance. For instance, on Zoom, we've attended some classes, and there probably won't be interaction between the students. You know, the lecturer or the teacher just comes and delivers the lectures, and that's it. Now, talk more about introducing LLMs into your curriculum. Instead of relating with the teacher, for instance, you prefer to relate with the LLM, and it's sort of one of the disadvantages, sort of creates that distance between the teacher and the student. So, it's definitely going to help the education system because you can get there, ask questions, get different opinions, and get different answers to the questions. The disadvantages are there." (Participant C)

Participant C expressed concerns about incorporating LLMs into curriculums, fearing it could reduce teacher-student interactions. According to this participant, introducing LLMs might be a bad idea because, like with online classes, there has been less interaction between teachers and students. Using LLMs could create more distance, as students might prefer interacting with the tool rather than the teacher. This could hinder building relationships and personal growth within the education system.

"Yes. If it can save time, because in that process, okay, it's good. But then, my question is, yeah, like coding and all such stuff, it is usually kind of you using your talent or your knowledge. So, it wouldn't affect the effort you're putting in. Sometimes, it's like anybody can get it. You know, some people like to use, what do you say, then getting it from some site, like, you know, putting your effort and trying to solve stuff. So, that kind of, what do you say, you know, people might lose that because everything they're getting in a click. Yes. So, one thing I feel like is that by inputting, nobody's making an effort; people just click something, get the answer, and just input it. One thing is that, but maybe that's a positive thing for saving time and stuff. But it also has a negative impact, I feel. Exactly. Yeah. So, people don't use their minds or brains; they can just get answers, which means nobody's putting in the effort. Everything is done by AI. So, yes, it's a real resource

that is not used. Critical thinking, lack of Critical thinking. Dependency is also another problem we are seeing now." (Participant G)

Some participants discuss the benefits of LLMs and the difficulty of introducing them into curriculums.

"It can also help the teachers; I mean, sometimes you have been assigned a course, perhaps that you haven't had before, and you need some help in order to design assignments and design the scope of a different lecture or a series of lectures. I can use chat GPT to get me on track and help me structure a course to make it better than I could design myself. Because of this LLM, it takes the integrated experience of all kinds of courses that exist on the internet and makes some kind of a synthesis of this. And this would be impossible for me. That's true. You can even save a lot of time. (Participant E)

So, I mean, the opportunities here are extremely large. Or I can ask a chat GPT, how much possibility do you assess that this text comes from a LLM? It's a real danger. I mean, what world are we living in? Exactly. [...] Like all those hackers and cyber criminals, they also use those LLMs to find vulnerabilities in websites and computer systems. I mean, there are so many interconnected systems around the infrastructure, the telecom business, the telecom nets, the energy grid, the power plants, everything is controlled by computers." (Participant E)

Participant E emphasized the advantages of LLMs for teachers, especially when assigned unfamiliar topics: This participant emphasized that LLMs can help design assignments and structure lectures, drawing from the vast array of existing courses online, creating a synthesis that would be impossible for an individual. This saves time while improving course quality.

5.1.4.   Student-teacher relationship

Participants were invited to share their thoughts on how LLMs affect the interaction between teachers and students and how the teacher's role should evolve in response to the rising usage of LLMs in education.

"Well, it is important for the teacher to maintain students' critical thinking at a decent level. If left uncontrolled, unmonitored, and unregulated at a course level for each teacher, these LLMs can definitely reduce critical thinking. So, teachers should be proactive; they should see this as an opportunity and not as a threat, but they need to recreate and update a lot of what we do, a lot in the assignment descriptions, in the requirements, in the courses, so that they, to some extent, he would make sure that the quality of the course, of the teaching, is not impacted. So, this is the way how, from a student from a teacher's standpoint, it requires more proactiveness. [...] It's important for students to be engaged all the time, so that definitely creates opportunities there. As I said earlier, use LLMs and a hybrid approach, which you cannot avoid. So, be creative, so that they are more active, to some extent, in the classroom. They can use that, but they need to be more critical and critically approach this, and they could use this as a complementary tool, as I said, but not as a unique tool to create assignments, essays, or whatever, so to speak." (Participant A)

Participant A emphasized the importance of maintaining student critical thinking when using LLMs: According to Participant A, teachers must be proactive, revising assignments and requirements to ensure course quality is not compromised. LLMs should be used creatively as complementing tools, rather than replacements, to keep students engaged and critical in their approach.

> *"I think that it's inevitable that LLMs will lead to changes in the kind of skills our students develop through our courses and the skills that will be different from, let's say, computer science students who were educated 20 years ago. They had completely different skills than today's programmer students. I must also say that I have no experience teaching programming courses. So, I don't know how they deal with this today in programming courses, but they should think hard about how we can incorporate those LLMs into the curriculum." (Participant E)*

Not every participant thinks that the student-teacher relationship is a positive development. A few participants highlighted critical thinking, dependability, and ethical considerations.

> *"Students are using LLMs anyway. Yeah. And more people using the better versions still attract more. So maybe the teacher's part is minimal in that case. You don't need them. Yeah. Cheating, for example. And students are not critical thinkers anymore. [...] I think it's, for instance, when the teachers we have now when they were studying, I mean, there was no LLM, nothing like, to help them out. So now, bringing it in, I would say they have not fully accepted it yet. Most teachers I know from personal experience still prefer to go through the traditional method, which is to do the research yourself. So, the relationship between the teacher and the students now is somewhat not so good, I would say, because especially when the teachers don't have a genuine or 100% way of confirming whatever information or whatever assignment was submitted to them is genuine or was done by the students. So it's the relationship, and I would say it's not so good. But if we are to fast forward to, let's say, five or ten years from now, then we have new generations of teachers and professors. So, it's more likely to be acceptable than compared to as it is at the moment." (Participant C)*

Participant C saw that students are increasingly using LLMs, which is reducing the need for traditional teaching methods. This participant thinks teachers' roles are becoming minimal as students rely on LLMs, affecting their critical thinking skills. Many teachers who have studied without such technologies prefer traditional techniques and are cautious about completely embracing AI. This skepticism impacts the teacher-student relationship as teachers struggle to ensure the validity of students' work.

> *"Unfortunately, it changes the exam format to oral exams for distance students, which I find extremely stressful. Maybe some students don't. And I preferred quizzes and written exams. But I think in the future, because of ChatGPT, distance students will no longer be able to use it. So, it's going to be difficult, especially for distance education in the future. They are already discussing how to change the schedule in most universities. What can they do? What's the, I mean, you know, what can they do? Do you want the students to write the exam, come to the university, and write the exam? If it is exams, during the exams, because somehow it is difficult to monitor. If it is online, you can teach, but for writing exams, you have to come in person." (Participant H)*

Participant H voiced concern about ChatGPT's impact on exam formats for distance students. According to this participant, it is unfortunate that exams have been changed to oral formats, which is stressful. Quizzes and written tests are preferable but may no longer be available. This move will be tough for distance education since colleges already contemplating adjusting, including requiring students to attend in-person exams.

5.1.5. Ethical considerations and solutions

During the interviews, all participants were asked to consider ethical concerns about using LLMs like ChatGPT in teaching and learning environments. They were also asked to offer guidelines or policies that they believe should be implemented for using LLMs.

> *"Apart from cheating, there is a problem of, for example, diminishing critical thinking. Students get their answers by asking questions. They got everything right there. So, more and more students are far from thinking critically, and that's the ethical part. And this dependency on AI also. Yeah, that's a very important point. [...] Regarding critical thinking, when facing problems, you ask AI instead of thinking yourself. Although it's good because it brings you some ideas and insights, you, as a human, should think about it more critically rather than just relying on AI. So yeah, that's very important. Students are not critical; they do not think properly and are dependent. And how do you feel about that as a teacher? No, maybe in one way, they can gain more knowledge. If some students feel like they want to know more, they will ask ChatGPT, and they can learn more. Maybe they will feel shy to ask in the classrooms, like we are quiet almost all the time. Yeah, that is a positive way we view it, but there are both positive and negative aspects. Yeah, it could be, for example, students not focusing enough on the lectures, and they know that there is something there that they can ask later if they don't understand. So, it can happen." (Participant D)*

Participant D discussed the balance of AI use in education. This participant believes that while AI provides ideas and insights, humans should still think critically rather than rely on it. Students are becoming less critical and more dependent. However, AI can assist shy pupils in gaining more knowledge by asking questions that they would not ask in class. The disadvantage is that students may not pay attention during lectures, knowing they may ask AI later.

> *"Chat GPT can create academic dishonesty and cheating if it's not properly monitored and controlled. Then, what does this mean, how do you monitor it, and how do you control it? Teachers can be creative with some pedagogical interventions, but I believe this can be regulated or addressed at a higher level in a university context. Universities should guarantee that these tools are used ethically and responsibly. So, the positive things or the benefits should outweigh the risks in that sense. There are benefits; students can leverage the potential of, or anyone, LLMs, but still, it should be monitored and controlled. What should universities do in this sense, or faculties, or I don't know, maybe create some guidelines and regulations and raise awareness amongst students and faculty on using these tools responsibly? So, to prevent academic dishonesty, which is very important.(Participant A)*

Participant A emphasized the hazards and controls associated with ChatGPT in education and explained that if not properly monitored and controlled, ChatGPT can lead to academic dishonesty and cheating. Universities should control its use to ensure it is done ethically and responsibly. Benefits should outweigh risks, with students utilizing LLM's potential within stringent restrictions. Universities and faculties should establish laws and promote student and teacher awareness to combat academic dishonesty.

> *"So, of course, you cannot completely rely on LLMs, but they offer possibilities that make the teaching process more efficient, I would say, not only on the student side but also for teachers. Of course, there are concerns about how much this should be used, and the regulations and guidelines should be clarified. Because there are, I mean, in the academic community, many academics appreciate these AI writing tools promised. Of course, others are concerned because you need, of course, those more traditionally oriented academics, who are even, I would say, technophobes. So, to some extent, they are accustomed to doing things in a specific way and struggle to adapt to rapid technological changes. But I believe these tools can improve the quality of the courses, the knowledge can be improved, and the efficiency is definitely on this LLM side. It's amazing." (Participant A)*

Participant A recognized the advantages and disadvantages of utilizing LLMs in education, as LLMs provide opportunities to improve teaching efficiency for both students and teachers. While many academics value these AI technologies, others are concerned, particularly those more conventionally oriented.

Some participants had good perspectives on addressing ethical challenges, while others had pessimistic views.

> *"[...] the ethical issues arise. So, I don't know how this can be solved. Well, after all, it has always been like that. And even in the past, without ChatGPT and when you studied on campus, there was still no 100% guarantee that you never copied or plagiarized. It was still possible. However, they were still examined when the students developed their thesis at home or did other paperwork. They had an oral exam where it was usually evident whether they plagiarized or did the work themselves. But sometimes you just can't avoid it like it's; it's not 100% in any case. Yes. I mean, even before ChatGPT, the problem was there." (Participant H)*

> *"Assume that the LLMs will get better and better, almost as good as the books. If they would, I mean, if the Charter GPT gives credit to its authors and owners, it's good. Otherwise, I think it's kind of cheating. All this information, as of now, is getting free. They get it free. Yeah, it's free of charge. If I, as a publisher, am selling a book or an article or something, for instance, and Charter GPT has access to it, it's my ad work at the end of the day. At the end of the day. Are we really able to, for instance, pay for it? I mean, for Charter GPT, do I really get part of the proceeds at the end of the day? Probably no. No. You have access to my information already. You have access to the publication I wrote already. So, that's why I mentioned that dealing with that will be a hell of a job. And I'm not sure how they are going to do that yet." (Participant C)*

Participant H stated that ethical concerns such as plagiarism have always existed in education, mentioning that even before ChatGPT, there was no assurance against copying or plagiarism. Students may still cheat on campus or at home. While oral tests frequently exposed dishonesty, it was never completely prevented.

Participant C highlighted intellectual property and compensation worries as LLMs advance. Problems occur when they use content without crediting the writers. If ChatGPT receives and uses others' work for free, it raises concerns regarding fair pay. Handling this fairly, particularly with several authors, is difficult.

5.1.6. Future Perspectives

Participants were asked to discuss their vision for the future of university education, including the continuous development and integration of LLMs. They were also asked what steps they believe should be implemented to ensure that using LLMs in education is ethical and advantageous to all stakeholders.

> *"I think it comes back to us teachers and examiners to, how should I say, design examination procedures that make it possible for us to follow the student, to follow the gradual progression of knowledge in the student. And maybe we can. Have you heard of something called learning analytics? Learning analytics is when we use, I mean, you as a student, you produce a lot of data. You have to get grades on different kinds of assignments, written exams, etc. Analyzing those data allows us to find patterns and identify weaknesses in a particular student's progression. So, we can use those data with AI to follow the students more closely. And I think those opportunities will balance out, I think, those inequalities that we are actively, as teachers and examiners, that we are designing our courses so that you shouldn't have a real advantage of those." (Participant E)*

Participant E emphasized the importance of teachers in developing appropriate assessment procedures to follow a gradual progression of student knowledge. The teachers may analyse grade and assignment data by using learning analytics to discover flaws and better monitor students. Using AI in this manner can help balance inequities, ensuring no unfair advantage is acquired.

> *"I think two things when I think about the future. One is these LLMs are here to stay, and we need to accept them, acknowledge them, and use them best. The other aspect is that the current LLMs and language models, like chat GPT and so on, are very limited. However, many people are working on other approaches, which will be exponentially more powerful. if we don't take steps to solve these current LLMs we have and integrate them into our work in our generation, what happens with the others that are coming, let's say, in a couple of years, which will be much more powerful? If we don't learn to work together with these tools, the others will just, you know, eat us. So, it is necessary, I think, that we accept this as a reality and really move fast because these are moving fast. I mean, we, the academy, are known as really going slow with these kinds of things. But I think we need to be much more aggressive in finding solutions and common ground on using this because I think the future is happening faster. One thing is that I know for sure it will come sooner than we realize. It's going to be interesting. It's very interesting and scary at the same time." (Participant B)*

Participant B emphasized that adjusting to LLMs is here to stay and that we must recognize and incorporate them into our work. Current models like ChatGPT are restricted, but more powerful versions will be available soon. If we do not adapt soon, we will lag. Academia, which has traditionally been slow, must act proactively to establish common ground and solutions. The future is arriving faster than we realize, making it both exciting and terrifying.

Regarding the future of LLMs, participants cautioned educational institutions to stay current with technology and make necessary adjustments before it's too late and they must catch up.

> *"I would like to mention that at the end of the day, it should get to a point where universities might not have the option to adopt it actually. LLMs are just like technology in different organizations. A couple of years ago, not everyone wanted to accept it. But in Sweden, for instance, now almost everyone uses BankID. That means whether you like it or not, you need to be connected to the internet and accept technology. So LLMs, at the end of the day, in a couple of years, would be the same thing. It's either you join the crowd, or you get left behind. And no one really wants to get left behind." (Participant C)*

Participants acknowledged that LLMs and related tools are extremely valuable to both students and instructors. By incorporating them into the curriculum and utilizing them widely, all stakeholders benefit, among other things, from saving a significant amount of time.

> *"You can ask AI to create PowerPoint presentations for you. So, you, as a teacher, can use that. And then, of course, you can infuse LLMs with some questions and topics, then create the rationale, and make a presentation for me consisting of 25 slides; the topic should be this, and the book should be this. And so, for me as a teacher, I'm not wasting two hours creating slides from one book, LLMs. I will do that with nice illustrations from the exact same book and from the exact references. So, what is the role of the teacher then? So, I should kind of facilitate the teaching process by presenting those slides and then having less time to prepare. And in that sense, of course, I see the future where students can use LLMs to save time and be more efficient and then concentrate on more hardcore or complex notions or concepts to study or concentrate in-depth and analyze the facts and something like that." (Participant A)*

Some areas of concern regarding the teaching system while utilizing LLMs, such as ChatGPT, have received less attention than other aspects of this technology.

> *"What I think is lacking here in this system is that the focus is now on the ethical considerations of the AI students use. But still, we have very, very few guidelines and information regarding how to use AI in the context of teaching, not learning. I mean, the teaching. When it comes to technological and pedagogical levels, maybe at the technological level, it's still good because if we refer to technology as the software itself, for example, using AI, chat GPT, or other types of AI systems, it is there, and we can use it. But on a pedagogical level, how can we use AI in a way that benefits from it by teachers? I mean, the pedagogical level is not clarified yet. It's like a box that is not open yet. So, from my perspective, there is still a long way to go to understand how to use AI in teaching. [...] However, in my view, we are still at the beginning of learning how to use AI in our teaching*

pedagogically. I think people, even politicians and policymakers, must start working on this area. This is important. (Participant D)

Participant D identified a weakness in the existing educational system and stated that the emphasis is on the ethical implications of students' use of AI. Still, there are few recommendations on how to use AI in teaching. While AI can give content and technological tools, its educational applicability remains unclear. There is a need to investigate how teachers may benefit from AI pedagogically. We are still in the early stages of comprehending this, and governments must begin to address it.

Table 2. Summary of Empirical Findings of Qualitative Data – Interview

No.	Themes	Empirical Findings
1	Academic Integrity	· Concerns over plagiarism and academic dishonesty · Usage for content generation with accuracy checks by educators · Emphasis on university-level regulations · Concerns about potential cheating and the difficulties in detecting it · Calls for creative pedagogical use
2	Accessibility and inclusion	· Digital divide concerns with paid LLMs · Economic barriers impact equitable access · Geographical and socio-economic factors · Utilize free LLMs versions effectively
3	Teaching Methodologies	· Beneficial effects of LLMs in assignment creation and curriculum enhancement · Potential reduction in critical thinking · Increased dependency on technology · Need for innovative pedagogical strategies · Emphasizing proactive educator adaptation
4	Student-teacher relationship	· Potentially reducing personal interactions · Importance of clear communication and guidelines on LLM · Concerns about eroding classroom engagement · LLMs to enhance but not replace human teaching elements
5	Ethical considerations and solutions	· Ethical concerns integral to LLMs use in all educational aspects · Necessity for ethical guidelines and monitoring · Institutional policies needed to manage risks such as academic dishonesty · Balancing technology benefits with academic integrity preservation
6	Future Perspectives	· Optimism about future LLMs integration · Need for rapid educational adaptation · Concerns about keeping pace with technological advancements · Potential for LLMs to revolutionize educational practices · Calls for research and policy development to harness LLMs responsibly

5.2.   Empirical Findings of Qualitative Data - Survey Findings (open-ended)

This section presents the empirical findings of information gathered from students and faculties at the university level after surveying the perceptions about the use of LLMs such as ChatGPT. The main objective was to reveal the impact of LLMs like ChatGPT and the ethical, social, and behavioural issues of using LLMs in academic interventions and present them through thematic analysis of open-ended responses. Semi-structured questions have been put forward to gather data for qualitative analysis. The responses from the survey are then opened in Excel for qualitative analysis. The affinity diagram shows the codes and subthemes in orange (see Figure 2). A total of 15 participants participated in the survey, and their responses were read for more detailed analysis, and 31 codes were generated. Further, the sub-themes were created by combining, categorizing, and dividing comply chunks of survey response data into specific, understandable, and easy to understand. The next step of analysis involves doing further analysis of subthemes and providing nuanced insights into the new broader themes. Figure 1 shows subthemes that are again categorized into six new, broader survey themes.
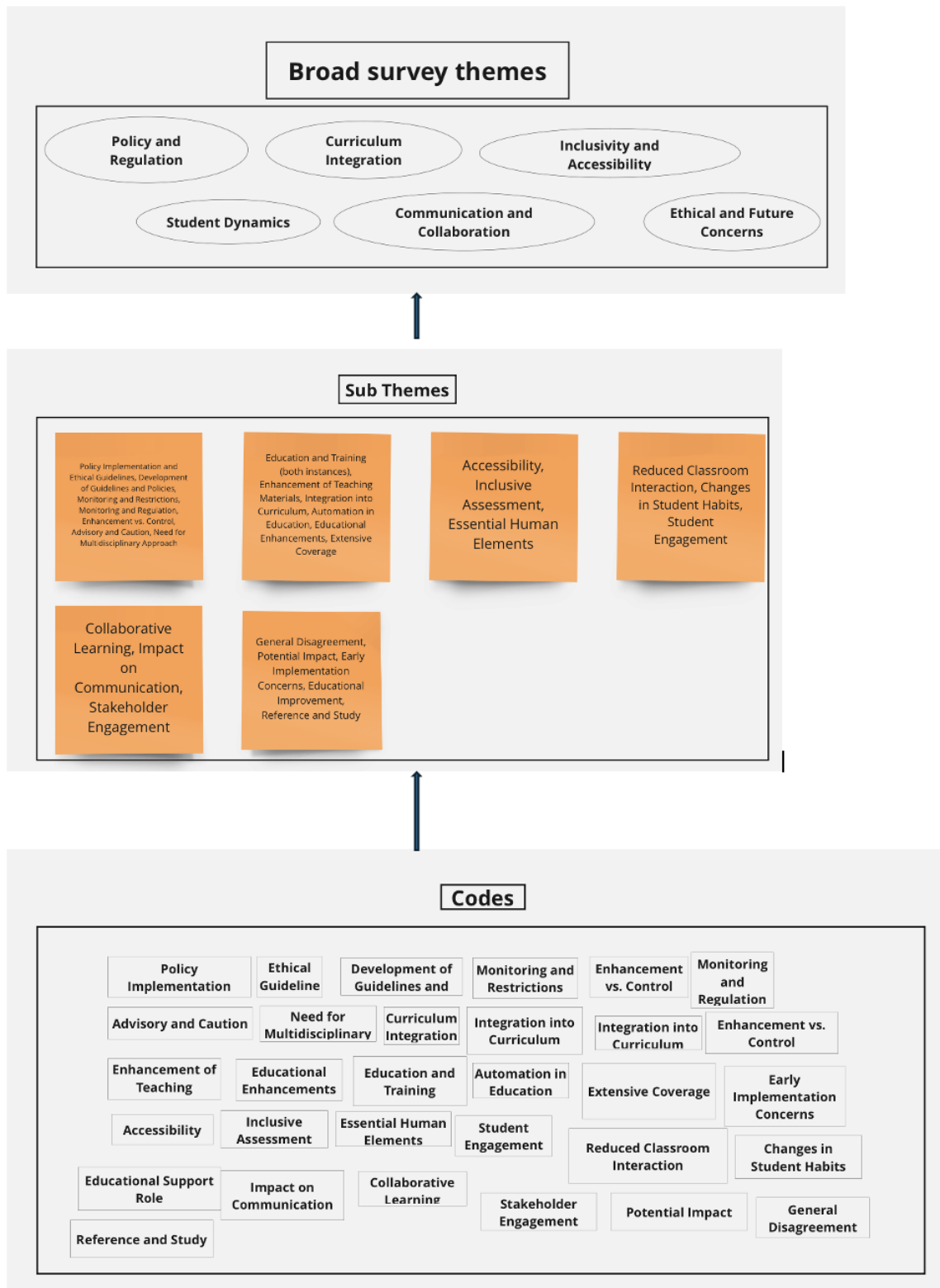
Figure 2. Affinity diagram of survey data - Themes, sub-themes and codes

5.2.1. Policy and Regulation

As LLMs like ChatGPT become more prevalent in university education, the need for comprehensive policies and regulations has emerged as a critical theme. These powerful AI technologies have the potential to influence teaching methodologies and student learning experiences significantly, necessitating the development of clear guidelines to address the challenges that arise from their adoption. This theme delves into how educational institutions adopt and implement policies to mitigate risks, particularly those related to data privacy concerns stemming from using LLMs. Subthemes such as policy implementation, guideline development and enhancement, and monitoring and regulation underscore the importance of establishing specific governance frameworks to oversee and regulate the integration of these AI models within university settings. Robust policies and regulatory mechanisms are vital in ensuring the responsible and ethical deployment of LLMs like ChatGPT, safeguarding data privacy while leveraging their potential benefits to enhance educational outcomes. Institutions must prioritize creating and enforcing these guidelines to navigate the complexities these cutting-edge technologies introduce effectively.

Here are the responses from our online survey of our participants.

> *"[...]clear guidelines and policies should be established on using LLMs, bringing them into practice, and discovering the best ways to harness their potential [...]"*

> *"Develop Ethical Guidelines and Policies […]"*

The responses highlight significant challenges that arise when integrating LLMs into higher education settings. One participant emphasizes the crucial need for establishing proper guidelines and policies to govern the utilization of LLMs within universities.

Another participant echoes this sentiment, suggesting the development of ethical guidelines and policies. This underscores the importance of addressing potential privacy and data security risks and maintaining standards to ensure LLMs are used responsibly and ethically in academic contexts.

These responses indicate a clear demand for robust governance frameworks and ethical guidelines to navigate the complexities and mitigate the risks associated with adopting LLMs technologies in higher education institutions.

5.2.2. Curriculum Integration

Curriculum Integration surfaced as a prominent theme when categorizing the codes and sub-themes, highlighting the potential of LLMs like ChatGPT to augment various aspects of the educational experience. This theme primarily explored how these AI models could enhance content creation, enable personalized learning approaches, and support research endeavours within academic settings.

The sub-themes that contributed to the overarching Curriculum Integration theme included Education and Training (encompassing both student and educator perspectives), Enhancement of Teaching Materials, Integration into Curriculum, Automation in Education, Educational Enhancements, and Extensive Coverage of subject matter.

Here are the responses to the survey from our participants.

> *"It is soon to talk about it, but a possible scenario is to integrate LLMs into university curriculums to enrich learning experiences e.g., by supplementing instruction, personalizing learning, and supporting research [....]"*

> *"LLMs have the potential to enrich the university curriculum by offering new opportunities for personalized learning, research, collaboration, and accessibility. As LLMs technology advances and becomes more integrated into educational practices, universities can leverage these capabilities to enhance the quality, effectiveness, and inclusivity of teaching and learning [....]"*

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The responses indicate a recognition that LLMs like ChatGPT are still in their nascent stages as emerging technologies. Still, they hold immense potential for integration into university curricula. One participant acknowledges that while these LLMs are budding, they offer benefits to enrich student's learning experiences and support research endeavours. The respondent highlights LLMs' capability for personalized learning, adapting to individual requirements and needs.

Another participant echoes the potentiality of LLMs and envisions their integration into educational practices within universities. They suggest that LLMs can enhance students' learning capabilities, foster collaboration, and offer accessibility advantages. The participant views LLMs as significant contributors to the educational sector, aiding student learning needs and enabling educators to improve teaching quality. There is a positive outlook on LLMs, such as ChatGPT's potential to elevate learning and teaching standards.

These responses underscore the perceived benefits of LLMs integration into curricula, including personalized learning, research support, collaboration facilitation, and overall enhancements to educational quality and accessibility for both students and educators.

5.2.3. Inclusivity and Accessibility

Another prominent theme that emerged from categorizing the sub-themes was Inclusivity and Accessibility. This theme encompassed the potential of LLMs like ChatGPT to promote inclusive practices and enhance accessibility within educational settings. The sub-themes contributing to this overarching theme included Accessibility, Inclusive Assessment, and Essential Human Elements.

Here is the response to our survey

> *"Accessibility: LLMs can help make educational content more accessible to diverse learners, including those with disabilities or language barriers. Through text-to-speech and translation features, LLMs can enable students to access learning materials in their preferred format and language, fostering inclusivity and accommodating different learning needs. Personalization: LLMs can support personalized learning experiences by adapting content to individual student preferences, learning styles, and abilities [....]"*

"Yes, it allows everyone easy access to information that may not have been accessible before. It also had reading features that could be useful for students with different learning styles and disabilities."

One perspective highlight how LLMs like ChatGPT can promote inclusivity and accessibility in educational environments for students with diverse learning needs and backgrounds. The participant suggests that these AI tools can assist learners with physical disabilities or linguistic diversity, breaking away from traditional one-size-fits-all approaches. ChatGPT's multilingual capabilities, which support over 60 languages, can cater to a wider range of students, fostering a more inclusive learning experience.

Another viewpoint emphasizes the potential of LLMs to create responsive and personalized learning environments that better fulfil individual students' academic requirements. The overarching theme revolves around the idea of inclusivity through personalized learning pathways and making education more accessible to all learners, regardless of their circumstances or abilities.

These perspectives collectively envision LLMs as catalysts for transforming educational content delivery and consumption, emphasizing inclusivity and accessibility. By tailoring learning experiences and removing barriers, these AI technologies could revolutionize education, ensuring that no student is left behind due to their unique needs or backgrounds.

5.2.4.   Student Dynamics

The themes that surfaced from categorizing sub-themes, such as Reduced Classroom Interaction, Changes in Student Habits, and Student Engagement, relate to the overarching concept of student dynamics. These themes delve into the potential impact of LLMs like ChatGPT on the interactions between students and teachers, as well as the role of technology in fostering student engagement. The theme of student dynamics explores how the integration of LLMs in educational settings could potentially alter the dynamics of classroom interactions. There are concerns that using these AI tools might lead to reduced face-to-face interactions between students and instructors, potentially affecting the traditional learning environment.

Here is the response to our survey.

"There probably would be less interaction in class. Students would know that LLMs can answer all their questions; hence, they may not interact with teachers as much [....]"

"Yes, introducing LLMs would decrease communication between students and teachers."

One respondent highlighted that the efficiency of LLMs has reduced direct interaction between teachers and students within the classroom setting. The commenter suggests that LLMs can influence the dynamics between students and teachers due to their impact on student behaviour. The accessibility of information provided by LLMs could potentially replace the traditional role of educators as the primary source of knowledge dissemination. This creates a situation where the conventional dynamics of teacher-student interactions may be disrupted.

Another respondent echoed similar sentiments, mentioning that introducing LLMs could decrease the level of interaction between students and teachers. The respondent expressed concern that the impact of LLMs is so significant that it may hinder face-to-face interactions, which are traditionally integral to educational procedures.

Both responses highlight the perceived risk that integrating LLMs in educational contexts could disrupt the conventional dynamics between students and teachers. There is a concern that the accessibility and efficiency of these AI models may diminish the need for direct interactions, potentially altering the traditional roles and relationships within the learning environment.

5.2.5. Communication and Collaboration

The theme of communication and collaboration emerges from the following sub-themes: Collaborative Learning, Impact on Communication, and Stakeholder Engagement. This overarching theme provides insights into how LLMs can potentially encourage collaborative learning environments and facilitate effective communication among various stakeholders within educational contexts.

Here is the response from our survey as follows:

> *"[...] a multidisciplinary approach that involves collaboration between educators, researchers, policymakers, ethicists, and other stakeholders."*

> *"[...] LLMs can facilitate collaborative learning experiences by supporting real-time communication, collaboration, and knowledge sharing among students and educators. Through features like chatbots, virtual assistants, and collaborative writing tools, LLMs can enable students to collaborate on projects, exchange ideas, and co-create content, promoting peer learning and collaboration across diverse groups [...]."*

One participant acknowledged the intricacies of seamlessly integrating LLMs into educational systems. The respondent proposed adopting a multidisciplinary strategic approach to navigate these complexities effectively. This approach would foster collaboration across various fields of knowledge and expertise to ensure the proper and responsible implementation of LLMs within academic settings.

Another participant highlighted the potential advantages of incorporating LLMs like ChatGPT into the educational landscape. They emphasized how these AI models could cultivate more interactive and collaborative learning environments for students. LLMs can facilitate collective learning experiences, enabling the sharing and co-creation of knowledge among learners. Their integration could pave the way for new avenues promoting increased engagement, participation, and innovative learning methodologies involving students and educators.

These responses underscore the need for a well-coordinated, multidisciplinary strategy to address the complexities of LLM integration while also recognizing the potential benefits these AI tools offer in fostering collaborative, interactive, and participatory learning experiences within educational contexts.

5.2.6. Ethical and Future Concerns

The surveys revealed themes surrounding Ethical Concerns and Future Implications, which emerged from sub-themes such as General Disagreement, Potential Impact, Early Implementation Concerns, Educational Improvement, and Reference and Study. These overarching themes address the ethical considerations of integrating LLMs into educational settings and concerns about their future impact.

Here are a few responses to our survey.

> *"Develop Ethical Guidelines and Policies, Provide Training and Education, Establish Ethical Review Boards, Promote Transparency and Accountability, Address Bias and Fairness, Protect Privacy and Data Security, and Engage with Stakeholders."*

> *"Addressing these concerns requires a multidisciplinary approach that involves collaboration between educators, researchers, policymakers, ethicists, and other stakeholders. By proactively addressing ethical issues related to LLMs in university education, universities can harness the potential of AI technologies to enhance teaching and learning while upholding ethical principles, promoting equity, and protecting the rights and interests of all students and educators."*

> *"By monitoring the usage and setting limits to checkmate unethical issues"*

> *"Since these LLMs, such as ChatGPT, are relatively new and have many unresolved ethical concerns. Students should be advised on how to use these platforms wisely."*

One perspective highlights the importance of developing ethical guidelines and understanding the ethical management of LLMs. Effectively managing AI tools like ChatGPT involves providing training, introducing clear guidelines, promoting transparency, and fostering stakeholder engagement. Implementing ethical management practices helps safeguard the responsible deployment of these technologies.

Another viewpoint emphasizes the value of a multidisciplinary approach, which invites diverse perspectives and approaches to ensure ethical strategies are well-understood, familiarized, and implemented. This approach aims to bring ethical issues related to LLMs like ChatGPT under control within academic settings, allowing institutions to harness the full potential of these technologies while improving teaching and learning practices, all while adhering to ethical principles and protecting the rights and interests of both students and educators.

Furthermore, a participant underscores the necessity for regulatory mechanisms to prevent misuse and manage the ethical implications of integrating LLMs into university education systems.

Lastly, a commenter advises on the importance of educating teachers and students alike on the ethical usage of LLMs such as ChatGPT. Nurturing a significant user base that is well aware of these technologies' limitations and capabilities is crucial for their responsible adoption and implementation.

These perspectives emphasize the need for ethical guidelines, multidisciplinary collaboration, regulatory frameworks, and comprehensive education efforts to ensure LLMs' ethical and responsible integration into educational contexts while maximizing their potential benefits and mitigating potential risks or misuse.

5.3. Survey analysis of close-ended responses

What is your role in the university?
15 responses

- Student
- Faculty
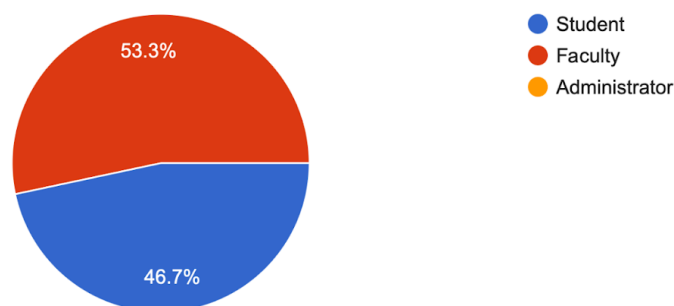- Administrator

53.3%

46.7%

Figure 3. Chart representations of Survey response

The pie chart data reveals an intriguing trend in the survey participation rates. The pie chart indicates a higher level of interest and engagement from the academic staff in contributing to this study. However, it is equally important to highlight that many students also participated in the survey, demonstrating their willingness to share their perspectives and actively participate in research efforts related to their educational experiences.

How often do you use LLMs in your educational activities?
13 responses

- Rarely
- Occasionally
- Frequently

30.8%

30.8%

38.5%

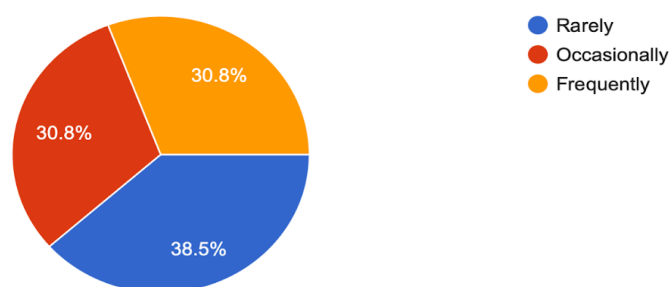Figure 4. Chart representations of Survey response

The responses provide an intriguing insight into the adoption and usage patterns of LLMs like ChatGPT among the participants. Out of the total 13 responses received, only 30.8% of the participants reported occasionally using LLMs such as ChatGPT. Interestingly, a slightly higher percentage, 38.5%, indicated that they use ChatGPT extensively or "a lot."

To what extent do you believe that LLMs affect the academic integrity of university students?
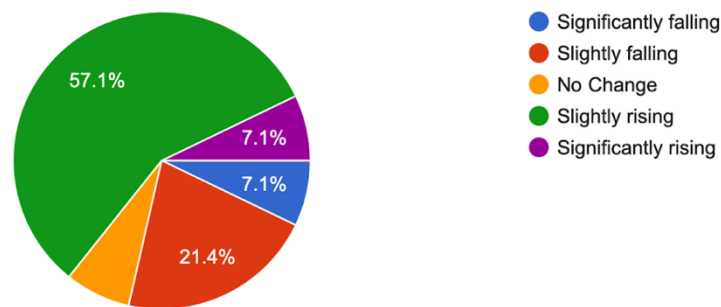14 responses

Figure 5. Chart representations of Survey response

The response sheds light on a concerning issue regarding the potential impact of LLMs on academic integrity among university students. A notable majority, 57.1% of the participants, selected the option, indicating that the effect of LLMs on academic integrity is "slightly rising," suggesting a growing concern over this matter. Interestingly, while a small percentage of 7.1% acknowledged a "significantly rising" impact, the fact that fewer or fewer participants chose the "no change" option is noteworthy.

Has/will the introduction of LLMs affect the teaching strategies used in your setting?
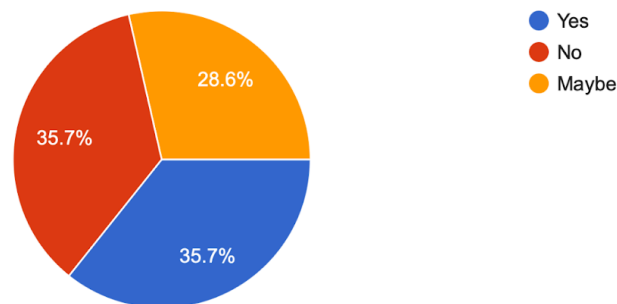14 responses

Figure 6. Chart representations of Survey response

The survey responses regarding the impact of LLMs on teaching practices reveal an intriguing divide among the participants. Notably, an equal percentage of respondents, 35.7%, agreed and disagreed that LLM usage affects teaching methods.

What impact do you believe LLMs have on the dynamic between educators and learners?
14 responses

Legend:
- Deteriorates
- Remains Same
- Improved

35.7%
21.4%
42.9%
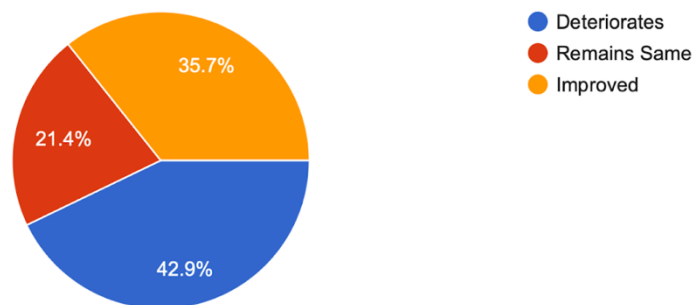
Figure 7. Chart representations of Survey response

The responses regarding the impact of LLMs on the dynamics between teachers and students reveal an intriguing divide. Only 35.7% of participants indicated that integrating LLMs has deteriorated the teacher-student dynamic. In contrast, a higher percentage, 42.9%, expressed that LLMs have improved the interactions and relationships between educators and learners.

What ethical concerns do you have about LLMs being used in college courses?
14 responses

Category	Count
Privacy	6 (42.9%)
Dependence on AI technology	7 (50%)
Misinformation	4 (28.6%)
Integrity	7 (50%)
No concerns	1 (7.1%)

Figure 8. Chart representations of Survey response

When considering their integration into university curricula, the respondents expressed significant concerns regarding the integrity and reliability of LLMs. There is apprehension about the potential compromise of academic integrity and an overreliance on these AI technologies, which emerged as the primary ethical concerns.

5.4.   Integration of Interview and Survey Findings
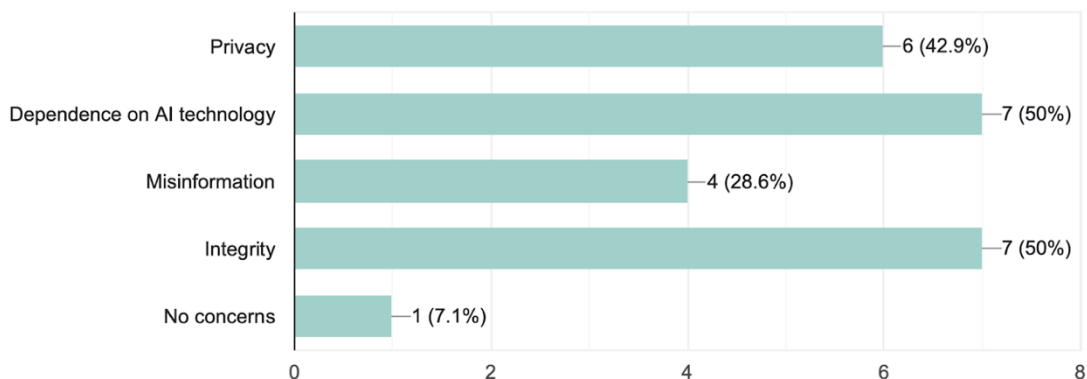
In this study, semi-structured interviews provided a rich qualitative canvas for capturing comprehensive personal narratives and insights into how LLMs are viewed and used in academic settings. Participants discussed their experiences, emphasizing the benefits and limitations of incorporating LLMs into educational practices. Common themes included improving learning processes through expanded access to knowledge and possible risks such as losing critical thinking abilities and academic integrity concerns.

Online questionnaires supplemented these interviews, giving a more comprehensive picture of the general perceptions and behaviours linked with using LLMs in education. While the surveys were mostly qualitative, they did include open-ended questions that allowed participants to comment on their opinions and experiences and closed questions that helped uncover patterns and general trends.

As shown in Table 3, integrating data from interviews and surveys necessitated thorough research to uncover and validate patterns. For example, if the interviews suggested that students believed their critical thinking skills were being harmed by their reliance on LLMs, the survey results were analyzed to determine the prevalence of this viewpoint among the larger sample. This helped to corroborate the qualitative insights with broader patterns, which improved overall comprehension of the issues at hand.

This synthesis of interview and survey results prepares the groundwork for the discussion chapter, where findings will be discussed within the theoretical framework of UTAUT2. Although UTAUT2 is usually employed in quantitative investigations, its constructs—such as performance expectancy, effort expectancy, social influence, and facilitating conditions—were a good lens for discussing qualitative data. This theoretical framework aided research into how LLMs' perceived usefulness and ease of use influence their acceptance and incorporation into educational contexts.

This qualitative method sheds light on the complex dynamics of implementing LLMs in higher education, highlighting a delicate interplay between technology potential and the challenges that it presents. It emphasizes the importance of carefully integrating AI technology into educational strategies in order to maximize their benefits while minimizing potential drawbacks. The study adds to the broader conversation about technology in education by providing insights and recommendations for effectively employing AI tools such as LLMs like ChatGPT in ways that correspond with educational aims and ethical norms.

Table 3. Integration of Interview and Survey Findings

Interview Themes	Survey Themes	Description
Academic Integrity	Policy and regulation	Ethical Implications of LLMs Use: This theme explores the risks of academic dishonesty and unethical use of LLMs. Emphasizes the need for policies and ethical guidelines to ensure LLMs are used responsibly in education to uphold academic integrity and prevent misuse like plagiarism. Calls for governance frameworks that balance AI innovation with ethical robustness.
Accessibility and Inclusion	Inclusivity and Accessibility	Accessibility and Equity: This theme examines whether LLMs can increase equitable access to educational resources for diverse students or if they may worsen existing disparities and inequalities.
Teaching Methodologies	Curriculum Integration	Pedagogical Impact: This theme explores integrating LLMs into teaching approaches and curricula and how this impacts pedagogical methods and student learning outcomes, such as critical thinking and dependency on technology.
Student-teacher Relationship	Student Dynamics	Interpersonal Dynamics: Investigates how LLMs influence the dynamics between students and teachers, examining impacts on communication, engagement, and interpersonal aspects of the student-teacher relationship.
Ethical Considerations and Solutions	Ethical and Future Concerns	Ethical Management and Future Planning: This section highlights the necessity of developing guidelines and strategies to navigate the ethical complexities of LLMs and explores considerations for responsibly integrating these technologies into future educational practices.

Future Perspectives	Communication and Collaboration	Future of Educational Practices: Examines the anticipated role of LLMs in shaping future educational practices, focusing on how they may influence communication, collaboration, critical thinking and the continual evolution of teaching approaches to adapt to these technologies.

6. Discussion

This chapter synthesizes the findings of empirical data obtained through interviews and online surveys with students and educators regarding their experiences with LLMs such as ChatGPT in higher education. The discussion is organized around key themes consistent with the UTAUT2, focusing on LLMs' ethical, behavioural, and social implications. Each theme directly relates to the research question. (RQ): "What impact does a LLM like ChatGPT have on the traditional dynamics of higher education from an ethical, behavioural, and social standpoint?". Table 3 illustrates the themes produced by categorizing the codes and sub-themes based on interview and open-ended survey responses. The following sub-chapters will address each of the major themes identified from the findings of the preceding chapter and explain how they are connected to the literature review in chapter two and the research question.

6.1. Academic Integrity

According to the interview and questionnaire data, participants expressed tremendous concern about academic integrity. The introduction of LLMs such as ChatGPT into higher education raises serious concerns about academic integrity, which is a fundamental component of educational ethics. The main concern is that LLMs can encourage academic dishonesty by allowing students to write essays, solve problems, and finish tasks without actively participating in the education process.

As stated by Cotton et al. (2023), while ChatGPT can offer many benefits for assessment in higher education, there are a few key challenges that ChatGPT and other AI language models like it may pose for assessment in higher education. One challenge with using GPT-3 for assessment in higher education is the possibility of plagiarism. AI essay-writing systems are designed to generate essays based on a set of parameters or prompts. This means that students could potentially use these systems to cheat on their assignments by submitting essays that are not their work. This undermines the very purpose of higher education, which is to challenge and educate students, and could ultimately lead to a devaluation of degrees.

Participants, including instructors and students, have voiced concerns about receiving false information when using LLMs like ChatGPT, raising questions about academic integrity. Although ChatGPT contains vast knowledge, it is also susceptible to biases and errors in the training material because it is taught on vast amounts of text from the internet and data supplied by human trainers. Even though it tries to provide accurate responses, it occasionally makes mistakes because its conclusions are based more on patterns than on facts and data. There are enormous amounts of text data out there that aren't naturally able to verify the accuracy or authenticity of the material that's been provided.

According to Vargas-Murillo et al. (2023), with the rapid evolution of technology, authors have become more reliant on AI as an easy-to-use tool that complements their work. However, a rising concern is the ethical aspects of these AI tools, where misuse can lead to a lack of creative thinking and research integrity, not to mention the inaccuracies this technology yields when not given exact prompts.

LLM, powerful algorithms that can generate and transform text, are set to disrupt language learning education and text-based assessments as they allow for the automation of text that can meet certain outcomes of many traditional assessments, such as essays. While there is no way to identify text created by this technology definitively, there are patterns that educators can use to adapt assessments to minimize the impact that these tools will have on academic integrity (Kumar, et al., 2022).

Participants have advised that to improve the accuracy of ChatGPT responses, it is vital to ask specific and unambiguous questions and clarify or provide more details if the responses appear to be incorrect. Furthermore, it is recommended that the answers provided by LLMs be double-checked with other credible sources, such as books and other literature.

6.2. Accessibility and Inclusion

One of the concerns raised by participants in the surveys and interviews that the writers of this research undertook was accessibility and inclusiveness. The social and economic backgrounds of the students vary. They also have different needs, like challenges with learning. It is mentioned that introducing LLMs such as ChatGPT into university curricula will worsen already-existing disparities. Students currently do not have free access to many LLM tools, namely those with more advanced versions. This could lead to a disparity in educational opportunities between students who can afford and those who cannot. Additionally, pupils who struggle with various other issues will also fall behind.

Cotton et al. (2023) wrote that another challenge is the potential for GPT-3 to be used to advantage some students over others unfairly. For example, if a student has access to GPT-3 and uses it to generate high-quality written assignments, they may have an unfair advantage over other students who do not have access to the model. This could lead to inequities in the assessment process. It can be difficult to distinguish between a student's writing and the responses generated by a chatbot application.

One of the topics covered during the conversation was how to address the issue of accessibility and inclusiveness. Among various options for addressing this issue, one method for dealing with this issue is to lobby for a policy at the university level. According to this recommendation, to avoid exacerbating already-existing gaps, which have always existed due to students' various backgrounds, higher education institutions such as colleges should be able to supply all AI technologies required as educational materials. If broadly adopted, it has the potential to alleviate inequality, which is mostly caused by economic constraints. Policymakers should consider this and implement it on a regional or national scale.

Geographical factors are one of the themes discussed by the participants in the findings. There is more to the digital gap in education than just who can access devices and the Internet. It includes differences in the availability, application, and gain from digital learning tools. The same quality of education that students in more technologically connected areas may often access with much difficulty by those in rural or underserved locations. Governments and educational institutions must collaborate to adopt laws and procedures prioritizing equity and access to address these issues.

6.3.   Teaching Methodologies

One of the primary themes of this study has been the incorporation of LLMs such as ChatGPT into teaching procedures, which signifies a radical change in instructional strategies. The findings of the interviews showed how LLMs are changing the way they provide instruction, what this means for the future, and how to best utilize these technologies in the classroom.

Although ChatGPT is a highly advanced chatbot, it presents challenges that may hinder the development of students' critical thinking skills. These arise as students increasingly rely on this AI tool to answer questions during their learning process rather than actively engaging with the material provided by their educators. It's crucial for students to cultivate independent thought, learning to identify, analyze, and synthesize information independently (Vargas-Murillo et al., 2023).

According to Ngo (2023), Teachers can utilize ChatGPT to create materials such as course outlines, presentations, quizzes, coding, grading, and scientific publications. ChatGPT is regarded as the best AI chatbot ever introduced to the public. It has sparked both excitement and confusion among educators. To ensure that ChatGPT is used for social good rather than harm, it is critical to consider both the possible applications and severe concerns associated with this AI technology.

Based on the findings, most participants agreed that LLMs like ChatGPT present opportunities and challenges in higher education. A complete ban might not be the wisest course of action, even with valid concerns about possible cheating. Rather, academic institutions should investigate how to customize assessments and leverage LLMs as teaching resources.

As Vargas-Murillo et al. (2023) stated, since ChatGPT was launched, teachers have expressed concern regarding its applications in the educational field. Critical thinking and originality are necessary skills that students need to harness. As discussed before, said skills can be put at risk when using ChatGPT to generate academic work. Plagiarism is another concern, although students and academic writers alike can still plagiarize without using ChatGPT. It may be better to assess the conduct behind these actions before banning an AI tool without considering its benefits.

The participants explained that they use LLMs in their educational activities, even though they are not from an institution that currently uses LLMs like ChatGPT in their curricula. They promote using LLMs widely in instructional processes. Including LLMs in the classroom has brought about new dynamics in teaching techniques. Previously, more resource-intensive teaching tasks were made possible by LLMs. With LLMs, teachers may concentrate more on interactive and student-centered teaching methods since they can produce content rapidly, conduct individualized tutoring sessions, and explain difficult concepts.

Higher education institutions must prioritize educating students on the responsible and ethical use of ChatGPT and other generative AI tools. Academics can also devise new assessment strategies that ChatGPT cannot easily replicate, such as evaluating learning processes rather than outcomes. Moreover, tertiary educators must address bias and falsified information in ChatGPT to ensure students construct accurate knowledge and engage in collaborative learning and discussion. Including AI literacy in graduate skills could enhance students' employability and readiness for the rapidly evolving job market. higher education institutions must prioritize educating students on the responsible and ethical use of ChatGPT and other generative AI tools.

Academics can also devise new assessment strategies that ChatGPT cannot easily replicate, such as evaluating learning processes rather than outcomes. Moreover, tertiary educators must address bias and falsified information in ChatGPT to ensure students construct accurate knowledge and engage in collaborative learning and discussion. Including AI literacy in graduate skills could enhance students' employability and readiness for the rapidly evolving job market (Rasul et al., 2023).

6.4. Student-teacher relationship

The results of this study demonstrate that, despite the advantages, many challenges are associated with integrating LLMs into teaching approaches. The possibility of less in-person interaction between teachers and students is one of the main concerns. There is a chance that the crucial human component of education may become less important as LLMs assume more explaining and tutoring responsibilities. This worry emphasizes the necessity of a well-rounded strategy in which LLMs supplement conventional instructional exchanges rather than replace them.

The application of ChatGPT in the field of education has broad prospects but also faces great challenges. The ternary structure of teacher-student interaction will be an indispensable part of the future educational structure. While ChatGPT technology offers new ideas and innovations in teacher-student interactions, it brings risks that need to be reflected upon and explored in practice to facilitate the continuous development of an increasingly diversified education (Lin et al., 2023).

Teachers have a crucial role in helping students overcome their reliance on technology, as this can result in a lack of critical thinking and problem-solving abilities if students rely too much on LLMs for assistance. Therefore, teachers need to create a curriculum that promotes critical engagement with the material and assessments that demand that students do more than merely memorize facts extracted from AI. As AI technology continues to grow and students become more comfortable with its use, it is important to note that AI-assisted learning, even though it can enhance teaching and learning processes, cannot replace human interaction in the educational field (Vargas-Murillo et al., 2023).

Introducing LLMs like ChatGPT can potentially improve student-teacher interaction, especially regarding individualized learning and instructional support. However, these resources must be used carefully and responsibly to improve rather than erode the educational link between students and teachers. By carefully balancing technology use with the indispensable human components of teaching, educators may create an environment that is more dynamic, encouraging, and productive.

6.5. Ethical and social considerations and solutions

As the study's findings demonstrate, certain ethical issues raised using LLMs like ChatGPT in educational contexts require serious thought and the creation of viable solutions. These worries center on matters like academic integrity, access equality, data privacy, and the influence on students' advancement and learning.

Ethical dilemmas within the realm of education and AI encompass issues such as data privacy, consent, and transparency. Schools and institutions face the ethical dilemma of responsibly handling student data, necessitating informed consent and the option for students to participate

or abstain from AI-driven educational initiatives. Maintaining transparency regarding the integration of AI in classrooms is crucial to establishing trust and addressing ethical concerns (Rane et al., 2023).

The results show that several participants suggested that data privacy is one of the main ethical issues with utilizing LLMs in education. To provide individualized solutions, LLMs need a large amount of data, some of which may contain sensitive student information. It is crucial to guarantee the privacy and security of this data. Therefore, strict data protection guidelines must be followed by educational institutions. According to Zhai (2022), regarding data security and privacy, AI systems often collect and process large amounts of student data. This can raise concerns about data security and privacy, particularly if the systems are poorly designed and implemented.

The advent of ChatGPT sparked notable reactions in the educational field. As an advanced chatbot, it exhibited a high degree of capability, offering myriad uses in academia. However, it also raised concerns due to potential misuse, notably infiltrating academic papers and thereby endangering the integrity and credibility of researchers. As technology evolves rapidly, authors increasingly turn to AI as a convenient tool to supplement their work, but this trend leads to ethical concerns. Primarily, the misuse of AI tools could undermine creative thinking and research integrity, not to mention the inaccuracies present when the technology does not receive precise prompts. Furthermore, there is a risk that students may lose their capacity to generate original ideas or construct valid arguments to support their research. So far, a comprehensive strategy to manage AI-assisted learning and control AI tool usage within educational institutions is still in the developmental phase. Nevertheless, the associated risks are visible and demand attention and analysis (Vargas-Murillo et al., 2023).

The findings further support the idea that LLMs such as ChatGPT can quickly produce thorough responses to intricate questions, which is problematic for academic honesty. These technologies could be used by students to finish tasks without really connecting with the subject matter, which would be detrimental to the educational process. Educational institutions can address this by creating policies defining the appropriate use of AI tools in academic research.

Another concern associated with using ChatGPT is academic dishonesty, as students may rely on this tool to generate their written assignments and submit them as their own work. Here, educators play a pivotal role in teaching their students about academic honesty, the importance of critical thinking, and the repercussions of misusing AI-generated texts. As AI technology continues to proliferate and students become more comfortable using it, it's crucial to remember that while AI-assisted learning can enhance teaching and learning processes, it cannot replace human interaction in the educational field (Vargas-Murillo et al., 2023).

6.6. Future Perspectives

In addition to becoming a trend, incorporating and using LLMs like ChatGPT in higher education also provides a glimpse into future approaches. Participants in this study discuss how teacher-student relationships are evolving, the moral issues they present, and how LLMs may continue to affect teaching strategies. Most of those questioned expressed great optimism over including LLMs in university curricula. They firmly believe that LLMs can completely transform how education is conducted. Additionally, they emphasize how quickly education must change and how important it is to be updated with technological developments.

According to Chukwuere (2024), applying AI technologies, particularly generative AI chatbots, into higher education institutions is reshaping the landscape of academic environments worldwide. As higher education institutions navigate the complexities of a rapidly evolving technological era, the future of AI chatbots in higher education presents both unprecedented opportunities and challenges. With the emergence of generative AI chatbots like ChatGPT, higher education institutions are at the forefront of a technological revolution that promises to revolutionize traditional teaching-learning and research paradigms.

Faculty should proactively embrace AI chatbots such as ChatGPT as powerful teaching, research, and service tools. By becoming informed and trained on AI, they can learn its capabilities and limitations, identify assessment strategies to reduce academic fraud and create innovative pedagogical solutions for future developments. In an AI-driven world, traditional learning will soon become obsolete. Instead, students will query AI for answers to their problems, from cooking to coding. Even better, they could use AI tools to refine existing solutions and exercise their imagination to create new solutions to future challenges with endless possibilities (Dempere, et al., 2023).

Like most technology, the challenge is our sentiments, experiences, and responses to it. LLMs like ChatGPT sparked discussion, excitement, and concern in higher education. Many academics appreciate AI writing tools' promise, while those accustomed to doing things in specific ways struggle to adapt to their rapid changes (Zdravkova, et al., 2023).

6.7.   Findings through the Lens of the Theoretical Framework

This study investigated the influence of LLMs like ChatGPT on higher education, using the UTAUT2 as the theoretical framework. UTAUT2 guided the analysis by focusing on key constructs such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit. Each construct provided a perspective for assessing the integration and implications of LLMs in academic settings.

Performance Expectancy: Interviews and surveys revealed that most participants viewed LLMs like ChatGPT as highly beneficial for enhancing their learning experiences. Both students and faculty reported better accessibility to information and increased efficiency in academic tasks, reflecting the performance expectancy construct of UTAUT2. This suggests that the perceived improvement in performance is a major factor in the acceptance of LLMs in education.

Effort Expectancy: Participants generally found LLMs easy to use, significantly reducing the effort needed for learning and administrative tasks. This ease of use positively influenced their acceptance and continued use, supporting the effort expectancy component of UTAUT2. The simplicity of interacting with these AI tools facilitated smoother integration into educational practices.

Social Influence: Social influence was also critical, as participants noted that peers' and instructors' endorsements or criticisms significantly impacted their attitudes and likelihood of using LLMs. The widespread discussion and endorsement of LLMs by academic peers and leaders encouraged more students and educators to experiment with these technologies.

Facilitating Conditions: The infrastructure and support provided by institutions, such as access to high-speed internet and training on LLMs, were crucial for adopting these

technologies. This finding aligns with the facilitating conditions construct of UTAUT2, emphasizing the importance of adequate resources and institutional support in adopting new technologies.

Hedonic Motivation: Many users expressed high levels of enjoyment and satisfaction in using LLMs, which is linked to their novel and interactive nature. This enjoyment, or hedonic motivation, was a strong factor in using LLMs, especially among students who found traditional learning methods less engaging.

Price Value: Although less prominent in traditional educational settings where institutions often cover costs, price value was relevant for participants concerned about potential future costs associated with premium features or services.

Habit: Over time, frequent use of LLMs led to habitual use among some participants, particularly when these tools were seamlessly integrated into the learning management systems they regularly accessed. This habitual use highlights the importance of incorporating innovative technologies into users' regular routines to enhance acceptance and reliance.

By summarizing the findings through the lens of the theoretical framework, namely UTAUT2, the study revealed a complex interplay of factors that influence the adoption and impact of LLMs in higher education. While the benefits in terms of performance expectancy and effort expectancy are clear, ongoing attention to social influence, facilitating conditions, and ethical considerations will be crucial for optimizing the use of LLMs.

7. Conclusion

This chapter summarizes the most relevant findings to present the study's conclusions. It then presents the study's contribution and highlights proposals for further research.

7.1. Conclusions

Through an analysis of the significant effects of LLMs such as ChatGPT in higher education, this thesis has shown the transformational potentials and the intricate obstacles presented by these technologies. These cutting-edge AI tools have the potential to greatly improve teaching methods through efficiency, accessibility, and customization when we incorporate them into academic settings. However, this integration also highlights ethical, behavioural, and societal issues that require thoughtful deliberation and calculated handling.

This study emphasizes that one of the main advantages is that LLMs may offer personalized learning experiences. These models can modify course materials to meet specific students' requirements and learning preferences, which may enhance engagement and results. The capacity to customize content could completely change how educational materials are presented, improving both the efficiency and enjoyment of learning.

However, these advantages come with serious ethical drawbacks, especially regarding data privacy, academic integrity, and algorithmic bias. Processing vast amounts of personal data is a requirement of using LLMs, which poses concerns regarding data security and privacy. It is critical to protect the confidentiality and integrity of student data and create AI systems free of biases that would otherwise reinforce inequality.

Another important topic of conversation is how educators will change in an AI-enhanced learning environment. Since LLMs may currently perform basic assessment and information delivery, teachers are expected to take on more advanced roles like mentoring and facilitation. This change calls for a reassessment of pedagogical approaches. It emphasizes the need for continuous professional development to allow teachers to incorporate AI into their lesson plans successfully.

Moreover, obtaining access to AI technologies presents a significant obstacle. If these technologies are not dispersed fairly, there is a real chance that they will worsen existing educational inequities. Therefore, it is essential to guarantee that every student has equal access to AI resources to stop the digital divide from getting wider. Furthermore, to ensure fair access to technology, this thesis suggests conducting further studies on the long-term effects of AI on learning outcomes and developing strong ethical frameworks for AI in education. This kind of research is crucial to minimize the risks associated with AI in education while optimizing its benefits.

It is critical that we proceed with optimism and caution as we stand on the verge of an educational revolution enabled by AI technologies, especially LLMs such as ChatGPT. We can leverage AI to improve educational methods while tackling the ethical, social, and behavioural issues it raises by encouraging a collaborative approach among educators, legislators, and technology experts. This balanced approach will create a future where technology supports an equal and successful educational system, allowing every student to learn and develop.

Finally, the authors recommend that all stakeholders in higher education establish precise standards for the use of AI, ensure fair access to AI resources, develop training initiatives, support a balanced approach to technological integration, and regularly evaluate the impact of AI.

7.2. Contribution

The HCI in information systems is the subject of this master's thesis, which focuses on using LLMs such as ChatGPT's impact on higher education institutes, more importantly, its ethical, behavioural, and social aspects. The study investigates how LLMs affect college students and their instructors and whether they contribute much to academic research and useful implementations in learning environments. By providing perceptions into how college students and teachers view, use, and engage with LLMs in learning environments, it contributes to our understanding of users' experiences by highlighting their issues, preferences, and experiences. The findings of this research can help guide decisions about the adoption and use of technology by informing educators, instructional designers, and policymakers on the possible advantages and drawbacks of using ChatGPT in teaching and learning processes.

The study has the potential to enhance the design of specific learning environments and instructional interventions that utilize AI-driven technologies for better learning outcomes by identifying characteristics that impact student engagement, motivation, and effectiveness of learning while utilizing LLMs like ChatGPT. Furthermore, the study can increase awareness of the ethical concerns surrounding using LLMs in higher education and offer suggestions for encouraging the responsible use of AI, defending the rights of students, and reducing risks and biases. The thesis's examination of LLM's usability, user experience, and socio-cognitive implications as a conversational interface in educational contexts can add to the expanding body of literature on human-computer interaction.

The study's identification of methodological challenges, knowledge gaps, and areas needing more research might help shape future research agendas and interdisciplinary collaborations that will advance our understanding of AI in education. Overall, a study on LLMs like ChatGPT's effects on college students and their instructors is considered valuable because it can produce practical insights, guide the use of evidence-based practices, and encourage the ethical and fair implementation of AI-driven technologies in higher education.

This study aligns with Gregor's (2006) typology of IS research by including descriptive, explanatory, predictive, and prescriptive contributions that increase knowledge and practice in information systems research. It contributes descriptively by capturing college students and teachers' experiences, perceptions, and interactions with LLMs in educational settings. The study makes an explanatory contribution by identifying factors influencing student-teacher engagement, learning results, and ethical, behavioural, and social considerations when using LLMs such as ChatGPT.

This thesis may have predictive value by predicting prospective trends, difficulties, and opportunities connected with integrating ChatGPT into higher education. It anticipates how changes in technology use, legislative decisions, and educational practices may impact student experiences in the future. Finally, the study's findings can help inform prescriptive contributions by giving recommendations, guidelines, and best practices for educators, policymakers, and technology developers.

7.3.   Future Research

For a complete understanding of the ramifications and to maximize the usage of LLMs like ChatGPT, additional study is necessary in several critical areas, given their quick development and incorporation in higher education. Future research can help guarantee that the use of AI in education enhances teaching and learning, conforms to ethical norms, and promotes equal educational opportunities for all students by focusing on these important areas.

Future studies should focus on establishing and enhancing ethical guidelines, particularly for applying AI in educational settings. This involves looking into the responsible applications of AI to maintain academic integrity, safeguard student data privacy, and guarantee fair access to technology resources. Moreover, comprehensive research on the impact of LLMs, such as ChatGPT, on educational methodologies is required. Research should study how these tools modify the traditional responsibilities of teachers and the possibility for AI to support pedagogical aims, especially critical thinking.

More research is also required to understand the long-term impacts of LLMs on the dynamic between students and teachers. This includes the potential effects of AI on assistance positions, communication styles, and the general dynamics of the classroom. Furthermore, research has to focus on how assessments are made to guarantee that they appropriately reflect student learning in settings where AI tools like LLMs are employed as AI becomes more integrated into the curriculum. This involves investigating new ways of evaluation that can successfully measure knowledge comprehension and application in the learning environments of these AI tools.

8. References

Abdaljaleel, M., Barakat, M., Alsanafi, M., Salim, N. A., Abazid, H., Malaeb, D., Mohammed, A. H., Hassan, B. A., Wayyes, A. M., Farhan, S. S., Khatib, S. E., Rahal, M., Sahban, A., Abdelaziz, D. H., Mansour, N. O., AlZayer, R., Khalil, R., Fekih-Romdhane, F., Hallit, R., … Sallam, M. (2024). A multinational study on the factors influencing university students' attitudes and usage of ChatGPT. *Scientific Reports, 14*(1). https://doi.org/10.1038/s41598-024-52549-8

Aithal, S., & Aithal, P. S. (2023). Effects of AI-based ChatGPT on higher education libraries. *SSRN Electronic Journal.* https://doi.org/10.2139/ssrn.4453581

Autor, D. (2022). The labor market impacts of technological change: From unbridled enthusiasm to qualified optimism to vast uncertainty. https://doi.org/10.3386/w30074

Blut, M., Chong, A. Y., Tsigna, Z., & Venkatesh, V. (2022). Meta-analysis of the unified theory of acceptance and use of technology (UTAUT): Challenging its validity and charting a research agenda in the red ocean. *Journal of the Association for Information Systems, 23*(1), 13-95. https://doi.org/10.17705/1jais.00719

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Castillo, M. J., & Taherdoost, H. (2023). The impact of AI technologies on E-business. *Encyclopedia, 3*(1), 107-121. https://doi.org/10.3390/encyclopedia3010009

Chukwuere, J. E. (2024, March 20). The future of Generative AI Chatbots in higher education. *arXiv.org.* https://arxiv.org/abs/2403.13487

Cotton, D., Cotton, P., & Shipway, J. R. (2023). Chatting and cheating. Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International.* https://doi.org/10.35542/osf.io/mrz8h

Crang, M., & Cook, I. (2007). *Doing Ethnographies.* Los Angeles: Sage.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five traditions* (2nd ed.). SAGE.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). London: Sage.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). London: Sage.

Dempere, J., Modugu, K., Hesham, A., & Ramasamy, L. K. (2023). The impact of CHATGPT on Higher Education. *Frontiers in Education, 8.* https://doi.org/10.3389/feduc.2023.1206936

Firat, M. (2023). What ChatGPT means for universities: Perceptions of scholars and students. *Journal of Applied Learning & Teaching, 6*(1). https://doi.org/10.37074/jalt.2023.6.1.22

Fui-Hoon Nah, F., Zheng, R., Cai, J., Siau, K., & Chen, L. (2023). Generative AI and ChatGPT: Applications, challenges, and AI-human collaboration. *Journal of Information Technology Case and Application Research, 25*(3), 277-304. https://doi.org/10.1080/15228053.2023.2233814

Gregor, S. (2006). The nature of theory in Information Systems. *MIS Quarterly, 30*(3), 611. https://doi.org/10.2307/25148742

Gustilo, L., Ong, E., & Lapinid, M. R. (2024). Algorithmically-driven writing and academic integrity: Exploring educators' practices, perceptions, and policies in AI era. *International Journal for Educational Integrity, 20*(3). https://doi.org/10.1007/s40979-024-00153-8

Habibi, A., Muhaimin, M., Danibao, B. K., Wibowo, Y. G., Wahyuni, S., & Octavia, A. (2023). ChatGPT in higher education learning: Acceptance and use. *Computers and Education: Artificial Intelligence, 5*, 100190. https://doi.org/10.1016/j.caeai.2023.100190

Howell, B. E., & Potgieter, P. H. (2023). What do telecommunications policy academics have to fear from GPT-3? *Telecommunications Policy, 47*(7), 102576. https://doi.org/10.1016/j.telpol.2023.102576

Huallpa, J. J., Flores Arocutipa, J. P., Panduro, W. D., Huete, L. C., Flores Limo, F. A., Herrera, E. E., Alba Callacna, R. A., Ariza Flores, V. A., Medina Romero, M. Á., Quispe, I. M., & Hernández Hernández, F. A. (2023). Exploring the ethical considerations of using Chat GPT in university education. *Periodicals of Engineering and Natural Sciences, 11*(4), 105-115. https://doi.org/10.21533/pen.v11i4.3770

Kalla, D., Smith, N., Samaah, F., & Kuraku, S. (2023). Study and analysis of Chat GPT and its impact on different fields of study. *International Journal of Innovative Science and Research Technology, 8*(3). https://ssrn.com/abstract=4402499

Kalyan, K. S. (2023). A survey of GPT-3 family large language models including ChatGPT and GPT-4. *SSRN Electronic Journal.* https://doi.org/10.2139/ssrn.4593895

Kaplan, B., & Maxwell, J. A. (2005). Qualitative research methods for evaluating computer information systems. In J. G. Anderson & C. E. Aydin (Eds.), *Evaluating the organizational impact of healthcare information systems* (pp. 30-55). Springer. https://doi.org/10.1007/0-387-30329-4_2

Khlaif, Z. N., Mousa, A., Hattab, M. K., Itmazi, J., Hassan, A. A., Sanmugam, M., & Ayyoub, A. (2023). The potential and concerns of using AI in scientific research: CHATGPT performance evaluation. *JMIR Medical Education, 9.* https://doi.org/10.2196/47049

Kumar, R., Eaton, S. E., Mindzak, M., & Morrison, R. (2022, May). AI and ai: Exploring the contemporary intersections of artificial intelligence and academic integrity. *ResearchGate.* https://www.researchgate.net/publication/361492226_AI_and_AI_Exploring_the_Contemporary_Intersections_of_Artificial_Intelligence_and_Academic_Integrity

Liesenfeld, A., Lopez, A., & Dingemanse, M. (2023). Opening up ChatGPT: Tracking openness, transparency, and accountability in instruction-tuned text generators.

Proceedings of the 5th International Conference on Conversational User Interfaces. https://doi.org/10.1145/3571884.3604316

Lin, Y., Long, Y., & Zhou, L. (2023). The impact of ChatGPT on university teacher-student interactions. *Lecture Notes in Education Psychology and Public Media, 24*, 197-204. https://doi.org/10.54254/2753-7048/24/20230703

Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences, 13*(4), 410. https://doi.org/10.3390/educsci13040410

Luckin, R., & Cukurova, M. (2019). Designing educational technologies in the age of AI: A learning sciences-driven approach. *British Journal of Educational Technology, 50*(6), 2824-2838. https://doi.org/10.1111/bjet.12861

Meyliana, Widjaja, H. A., Santoso, S. W., Petrus, S., & Jessica. (2019). The enhancement of learning management system in teaching learning process with the UTAUT2 and trust model. *2019 International Conference on Information Management and Technology (ICIMTech).* https://doi.org/10.1109/icimtech.2019.8843828

Ngo, T. T. (2023). The perception by university students of the use of ChatGPT in education. *International Journal of Emerging Technologies in Learning (iJET), 18*(17), 4-19. https://doi.org/10.3991/ijet.v18i17.39019

Or, C. (2023). Towards an integrated model: Task-technology fit in unified theory of acceptance and use of technology 2 in education contexts. *Journal of Applied Learning & Teaching, 6*(1). https://doi.org/10.37074/jalt.2023.6.1.8

Putra, F. W., Rangka, I. B., Aminah, S., & Aditama, M. H. (2023). ChatGPT in the higher education environment: Perspectives from the theory of high order thinking skills. *Journal of Public Health, 45*(4), e840-e841. https://doi.org/10.1093/pubmed/fdad120

Randall, D., & Rouncefield, M. (2014). Ethnography. Interaction Design Foundation - IxDF. https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/ethnography

Rane, N., Rane, J., Tawde, A., & Choudhary, S. P. (2023). CHATGPT is not capable of serving as an author: Ethical concerns and challenges of large language models in education. *International Research Journal of Modernization in Engineering Technology and Science, 5*(10), 851–874. https://doi.org/10.56726/irjmets45212

Rasul, T., Nair, S., Kalendra, D., Robin, M., Santini, F. O., Ladeira, W. J., Sun, M., Day, I., Rather, R. A., & Heathcote, L. (2023). The role of ChatGPT in higher education: Benefits, challenges, and future research directions. *Journal of Applied Learning & Teaching, 6*(1). https://doi.org/10.37074/jalt.2023.6.1.29

Rezaev, A. V., & Tregubova, N. D. (2023). ChatGPT and AI in the universities: An introduction to the near future. *Vysshee Obrazovanie v Rossii = Higher Education in Russia, 32*(6), 19-37. https://doi.org/10.31992/0869-3617-2023-32-6-19-37

Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning & Teaching, 6*(1). https://doi.org/10.37074/jalt.2023.6.1.9

Strzelecki, A. (2023). To use or not to use ChatGPT in higher education? A study of students' acceptance and use of technology. *Interactive Learning Environments*, 1-14. https://doi.org/10.1080/10494820.2023.2209881

Su, J., & Yang, W. (2023). Unlocking the power of ChatGPT: A framework for applying generative AI in education. *ECNU Review of Education, 6*(3), 355-366. https://doi.org/10.1177/20965311231168423

Vargas-Murillo, A. R., Pari-Bedoya, I. N., & Guevara-Soto, F. de. (2023). The ethics of AI assisted learning: A systematic literature review on the impacts of CHATGPT usage in education. *Proceedings of the 2023 8th International Conference on Distance Education and Learning.* https://doi.org/10.1145/3606094.3606101

Venkatesh, V. (2022). Adoption and use of AI tools: A research agenda grounded in UTAUT. *Annals of Operations Research, 308*(1–2), 641–652. https://doi.org/10.1007/s10479-020-03918-9

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425. https://doi.org/10.2307/30036540

Venkatesh, V., Raman, R., & Cruz-Jesus, F. (2023). AI and emerging technology adoption: A research agenda for operations management. *International Journal of Production Research*, 1-11. https://doi.org/10.1080/00207543.2023.2192309

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly, 36*(1), 157. https://doi.org/10.2307/41410412

Venkatesh, V., Thong, J., & Xu, X. (2016). Unified theory of acceptance and use of technology: A synthesis and the road ahead. *Journal of the Association for Information Systems*, *17*(5), 328-376. https://doi.org/10.17705/1jais.00428

Wei, W. (2023, December 15). These smartglasses use ChatGPT to help the blind and visually impaired. *Business Insider*. https://www.businessinsider.com/envision-glasses-chatgpt-google-glass-help-blind-visually-impaired-2023-12

Williams, R. T. (2024). The ethical implications of using generative chatbots in higher education. *Frontiers in Education, 8.* https://doi.org/10.3389/feduc.2023.1331607

Wu, T., He, S., Liu, J., Sun, S., Liu, K., Han, Q., & Tang, Y. (2023). A brief overview of ChatGPT: The history, status quo and potential future development. *IEEE/CAA Journal of Automatica Sinica, 10*(5), 1122-1136. https://doi.org/10.1109/jas.2023.123618

Zarifhonarvar, A. (2023). Economics of ChatGPT: A labor market view on the occupational impact of artificial intelligence. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4350925

Zdravkova, K., Dalipi, F., & Ahlgren, F. (2023). Integration of large language models into higher education: A perspective from learners. *2023 International Symposium on Computers in Education (SIIE).* https://doi.org/10.1109/siie59826.2023.10423681

Zhai, X. (2022). ChatGPT user experience: Implications for education. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4312418

Appendices

Appendix A. Written consent for interview

Consent Form for Participation in Thesis Research Interview

Title of Study: The impact of a Large Language Model (LLM): A qualitative study on how students and educators perceive the use of LLMs such as ChatGPT within conventional university education dynamics.

Researcher: Tadiwos Gebre Hiwot & Sarita Namuduri

Advisor: Behrooz Golshan

Introduction: You are invited to participate in a research interview for a thesis conducted by Sarita Namuduri & Tadiwos Gebre Hiwot, graduate students at LNU. This interview is part of a research study aimed at understanding the perceptions of students and educators on the use of LLMs such as ChatGPT within conventional university education dynamics. Your participation will provide valuable insights into the ethical impact of a Large Language Model (LLM) like ChatGPT.

Purpose of the Study: The purpose of this research is to investigate the impact of large language models like ChatGPT on university students and instructors, including usage patterns, perspectives, academic performance, information retention, evaluation, critical thinking, and, most importantly, ethical implications. Based on the current information gap, the findings may aid in the investigation of LLM's effects on university students and instructors, particularly when it comes to issues such as ethical challenges. Although the use of LLMs such as ChatGPT and related conversational agents in educational environments is increasing, there is still a lack of comprehensive knowledge regarding the issues and ethical implications. LLMs or ChatGPT interactions with students and teachers may raise ethical questions about data privacy, algorithmic bias, accountability, and transparency. It is also vital to investigate the potential consequences of LLMs on student agency, autonomy, and well-being.

Procedures: If you agree to participate in this study, you will be asked to: Engage in a thirty-minute interview conducted via Zoom. Discuss your experiences and opinions. Allow the interview to be recorded to ensure accuracy in data collection and analysis.

Voluntary Participation: Your participation in this study is entirely voluntary. You may choose not to participate, and you may withdraw at any time during the study without penalty or loss of benefits to which you are otherwise entitled.

Confidentiality: Your responses in this interview will be confidential. Audio recordings and transcripts will be used solely for the purpose of this research. All data will be stored securely and will only be accessible to the research team. Any reports or publications resulting from this study will use pseudonyms and will not include any information that could directly identify you.

Risks and Benefits: There are no known risks associated with this study beyond those of everyday life. While there may be no immediate rewards for you, your involvement is intended

to provide useful information to help address the lack of comprehensive knowledge about the challenges and ethical consequences.

Consent: By signing this form, you are agreeing to participate in this research study. A copy of this consent form will be provided to you for your records. I have read the above information. I have asked any questions I have at this time and have received satisfactory answers. I consent to participate in this research study.

Participant's Name (Printed): _____

Participant's   Signature: _____

Date: _____

Researchers'   Signature: _____

Date: _____

Appendix B. Informed Consent for Survey Participation

Survey for Teachers and Students to asses the impact of a LargeLanguage Model (LLM) like ChatGPT in University education

B   *I*   U̲   🔗   𝔻

Dear Participant,

Thank you for taking the time to complete this survey. The goal of this study is to investigate the ethical implications of Large Language Models (LLMs) such as ChatGPT on the traditional dynamics of university education. It is critical to comprehend the opinions and experiences of our university community members regarding this evolution as technological advancements continue to be integrated into our educational systems.

Your observations will greatly advance our knowledge of the effects of LLMs in academic environments, particularly as they relate to issues of academic integrity, instructional design, accessibility, and the quality of the educational process. Rest assured that all of your answers will be kept confidential and anonymous. It is not necessary to provide any personal information, and the information gathered will only be used for research.

Your participation is entirely voluntary, and you can withdraw at any time without consequences. By continuing to complete this survey, you indicate that you understand its purpose and agree to participate in the terms outlined.

Appendix C. Survey Questionnaires

Open-ended Questionnaires :

1. How can we prevent misuse of LLMs in educational settings?

2. Do LLMs promote inclusive learning environments? Please explain why.

3. If the answer to #10 is yes, please explain the impact of any existing or prospective changes to teaching practices.

4. Can LLMs replace any part of the teacher-student relationship? Please be more specific.

5. How should Universities handle these ethical issues?

6. How do you see LLMs fitting into the curriculum of universities in the future?

7. Please provide any additional comments or concerns you have regarding the ethical impact of LLMs such as ChatGPT in university education.

Close-ended Questionnaires:

1. What is your role at the university?

2. To what extent are you familiar with Large Language Models (LLMs) such as ChatGPT?

3. Have you ever used LLMs for educational purposes?

4. How often do you use LLMs in your educational activities?

5. To what extent do you believe that LLMs affect the academic integrity of university students?

6. How have you observed students abusing LLMs, and do you think this is even possible?

7. What role do LLMs play, in your view, in making educational resources accessible to students from a variety of backgrounds?

8. Has/will the introduction of LLMs affect the teaching strategies used in your setting?

9. What potential benefits might arise from using LLMs in instructional strategies?

10. What possible negative effects might using LLMs in the educational setting have?

11. What impact do you believe LLMs have on the dynamic between educators and learners?

12. What ethical concerns do you have about LLMs being used in college courses?

Appendix D. Semi-Structured Interview Questions

Interview questions about the impact of using LLM, such as ChatGPT, to explore the perceptions of students and instructors at higher education institutions.

1. Can you describe your understanding and experience with Large Language Models (LLMs) like ChatGPT in the context of university education?

2. How do you perceive the role of LLMs in educational settings, particularly at the university level?

3. In your opinion, how does the use of LLMs by students for academic purposes affect the traditional notions of academic integrity?

4. Can you provide examples or scenarios where LLMs might pose ethical challenges in academic assessments?

5. How do you think LLMs could influence the accessibility of educational resources for students with diverse needs and backgrounds?

6. Do you believe that LLMs can level the playing field for students facing barriers, or do they exacerbate existing inequalities? Please explain.

7. How will including LLMs in the curriculum impact the interactions between teachers and students?

8. What are the potential benefits and drawbacks of incorporating LLMs into teaching and learning practices from an ethical standpoint?

9. In what ways do you think LLMs could impact the relationship between teachers and students?

10. How do you think the role of the teacher should evolve in response to the increasing use of LLMs in education?

11. What ethical guidelines or policies do you think should be established for the use of LLMs in university settings?

12. Can you suggest any strategies or measures universities can adopt to mitigate LLMs' potential negative ethical impacts on education?

13. How do you envision the future of university education with the continued development and integration of LLMs?

14. What steps do you believe should be taken to ensure that the use of LLMs in education remains ethical and beneficial for all stakeholders?

Appendix E. Contributions

This thesis was a joint effort between Sarita Namuduri and Tadiwos Gebre Hiwot. Each of us contributed significantly to different aspects of the research. The division of responsibilities was as follows:

Sarita Namuduri Contributions

1. Selected the thesis title, research question, which later refined through discussions with the co-author, Tadiwos.
2. Conducted an extensive literature review, identifying key themes, gaps, and relevant studies to establish the research context.
3. Developed the theoretical framework, focusing on how a specific model can be applied to evaluate technology acceptance and use in educational settings.
4. Detailed the Methodological Tradition and Methodological Approach, emphasizing the qualitative nature of the research and the chosen research design.
5. Managed the analysis of the survey component of the empirical research, ensuring comprehensive data collection and thematic analysis. Also tried to contact the respondents through various social media platforms, friends, and emails.

Tadiwos Gebre Hiwot Contributions

1. Title Refinement: Collaborated in refining the initial thesis title and research question, ensuring it accurately reflected the scope and focus of the research.
2. Introduction, Abstract, Acknowledgements: Authored the introduction, abstract, and acknowledgements sections, setting the context and scope of the study.
3. Data Collection Methods: I described the data collection methods in detail, ensuring clarity and reproducibility of the research approach. Methods of Data Analysis: Defined the data analysis methods, detailing the techniques used to interpret the qualitative data. Reliability and Validity: Ensured the reliability and validity of the research findings through rigorous methodological practices. Ethical Considerations: Addressed the ethical considerations of the study, ensuring that all research activities complied with ethical standards.
4. Empirical Findings - Interviews: initial analysis of interview data and Thematic Analysis was done.
5. Discussion and Conclusion: Played a major role in synthesizing the findings from the survey and interviews into a cohesive discussion, aligning the results with the theoretical framework and literature review.

Joint Contributions

- We jointly handled the semi-structured interviews, from planning to contacting the respondents, including teachers and students, contacting them through emails, and conducting the Zoom interviews to analyse the data gathered during these sessions collaboratively.
- We worked together collaboratively, integrating various research components into a unified document, ensuring coherence throughout.

We comprehensively addressed the research question by leveraging our strengths and working collaboratively. From ethical, behavioural, and social standpoints, we provided meaningful insights about LLM, such as ChatGPT's impact on higher education dynamics. We are deeply grateful for our collective efforts.

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